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ACCURACY

brightens the far corners



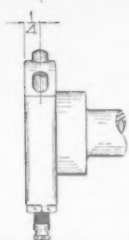
A FEEBLE yellow flicker from a fragile, costly bulb in a few wealthy homes has—in the course of forty years — been stepped up to a strong white light that brightens the remotest corners of the land. Today's light bulb costs only a few cents; it is remarkably efficient . . . and its efficiency is even now being constantly increased. Accuracy makes the difference. Precision manufacture — machine tool performance accurate to "tenths" — consistently creates new wealth, comfort, convenience, and safety for all people.

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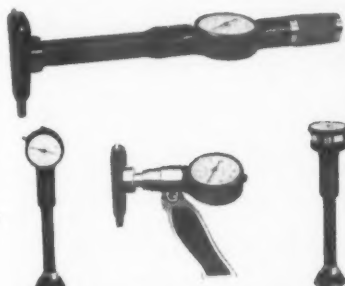


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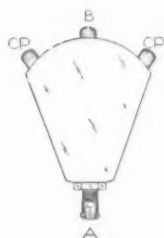
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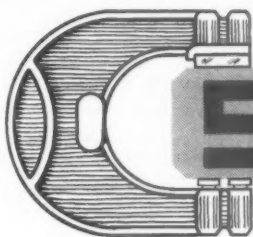
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GAGES

The Tool Engineer

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MARCH, 1940

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Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, Tool Engineers, tool designers and others who are responsible for production in mass manufacturing plants throughout the nation and in some foreign countries.

Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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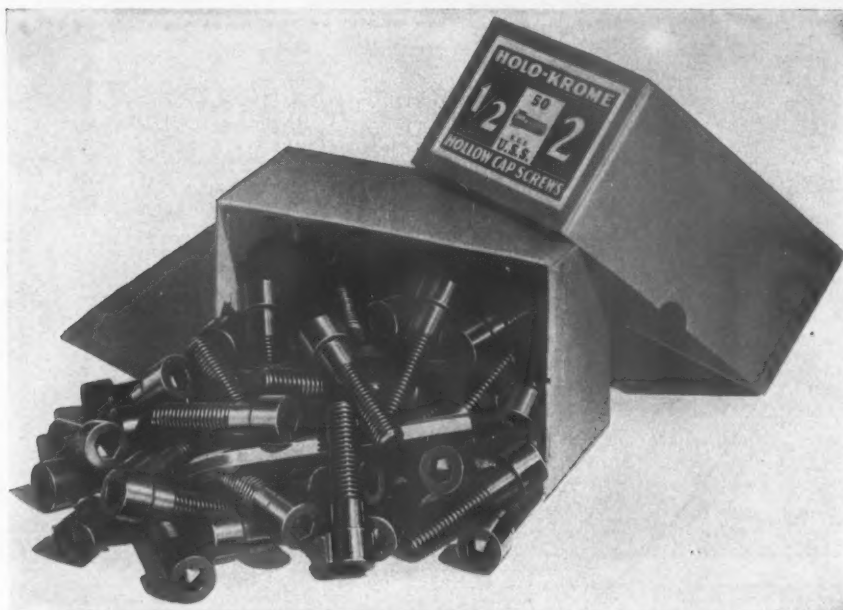
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CHANGE

Should Mean

IMPROVEMENT

AN EDITORIAL BY
A. E. RYLANDER

COINCIDENTAL with the inauguration of the tooling program for the '41 models by the auto industry, the nation's political machinery grinds out tentative candidates for important national offices. Of the many called, few will be chosen; in the final analysis, the "machine" selects the candidates for Chief Executive, of which but one will be a near Hobson's choice of the people. It works that way.

There is, however, this difference between the industrial and the political machine, that the first implies a definite improvement over previous models, whereas the latter may be rich in promise but inadequate in performance. It works that way, too.

As Tool Engineers, we are but vicariously concerned with politics; ours is the world of technological improvement. On sound precedents, as scientific data, painstaking research and proven experiments, the engineers of America create and improve. As even nature abhors stagnation, the engineering world effects changes, but changes that have the definite end of improvement. More, the engineering world moves in absolute harmony with the industrial.

Given the incentive, as government encouragement to business, the engineers would doubtless evolve enough new things, with the tools for their production, to provide employment for every willing worker in the land. And just as surely, were industry reasonably unhampered, were its tax burden lightened and government co-operation assured, there would be produced in this land enough of commodities so that the spectre of post-war depression would be a figment of the imagination, not a looming portent. For in a pinch, we can be sufficient unto ourselves; Americans can use what Americans produce.

We have evolved the highest standard of living in the world by the simple correlation of production and consumption. That rule worked admirably up to '29, when the national trend was definitely toward the upper levels, not to reduction to a mean. Then, there was no "submerged third," no unemployment problem. Rather, an employment problem engendered by a scarcity of skilled labor. There was mass prosperity without class division.

We have had political change, no doubt well intentioned but disappointing in results. Responsibility for economic chaos, an unprecedented and growing national debt, mass unemployment and the creation of a dependent class is evaded. The burden of responsibility is placed on the industrial machine, and some of our politicians would halt technological advance, discourage invention. But when the machine functioned to near capacity it provided employment, shortened hours and raised standards of living. Equivocate as one will, debate the issue without end, the cold truth is that the machine, more than any other agency, has been the contributing factor in putting America in first place in the march of world progress.

The typewriter that this editorial is written on, the linotype and the press that prints it, the addressing machine and the various vehicles of transportation, has each employed its legions in the making, sales and distribution. It is so with all invention, all technological improvement, end without end. It is all so utterly clear, so reasonable that thinking people experience a sense of shock when the machine is cited as a cause of unemployment. We know that this is not so; we have ample evidence to support the place of the machine in the scheme of social and economic progress. It is essential that this truth be impressed on the man or men selected to head this nation in '41.

As a definite example, Henry B. duPont, speaking in Detroit Jan. 24th, pointed out that twenty years ago the electric refrigerator cost \$550, averages \$170 now. And in the two decades production has stepped up from five thousand to two million units, meanwhile forming the basis for a vast air conditioning industry and a new frozen foods industry. This is a typical case for technological improvement.

We know that there are national leaders who are keenly alive to the merits of the machine. We know this because we have had them as speakers at our Tool Engineers' conventions, and, as men used to dealing with realities, we have been impressed with their sincerity. Theirs were not political talks, the oratory of vote getters, but a defense of a system of coordination and cooperation between government and industry that begot results. When that system is restored—and restored it must be!—the social and economic problems of the past decade will disappear along with the "submerged third." And however vicarious our interest in politics may be, it is up to us, as citizens, to support the men who fight with us for the best interests of our country. A change impends, but it must be a change with improvement.



As tools come from the factory they are wrapped in protective oiled paper, boxed and labeled for protection against dirt and moisture, and to facilitate prompt shipment.



Left: Central shipping floor, fireproof tool storage bins and racks on either side.



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A. S. T. E. ANNUAL MEETING 1940



EDUCATION



ECONOMICS

ECONOMY and EDUCATION— *Keynotes of Annual Convention*

AT least two major problems facing industry and society today may approach solution at the 1940 Annual Meeting of the American Society of Tool Engineers.

Why is it there is such a shortage of trained Tool Engineers today? With many professions overcrowded, with many trained men seeking employment in their field why should this field of Tool Engineering be so undeveloped? Perhaps the newness of the science of Tool Engineering may be the reason why our educational institutions have not recognized its value. The technical session "Tool Engineering Education" scheduled for March 8, may bring the answer. The subject is being attacked from all sides. Industry will attempt to describe its requirements. Speakers from universities, high schools and vocational schools will attempt to meet the challenge. There is some talk that our educational institutions and our industries have drifted too far apart; neither understands the problems of the other. Neither fully appreciates the other yet neither could exist without the other. It is hoped that the technical session under the subject "Tool Engineering Education" will bring about a better understanding and a closer relationship and finer spirit between industry and those who educate potential Tool Engineers for future industry.

Under the enormous tax burdens

prevalent today, economy in tooling becomes highly important. In the field of industrial management there must be a relationship between production volume



JAMES R. WEAVER
President, American Society of Tool Engineers
Director Equipment, Inspection and Tests, Westinghouse Electric & Manufacturing Company.



Hotel New Yorker, 8th Avenue at 35th Street, in New York City will be "home" to the host of Tool Engineers attending the A.S.T.E. Annual Meeting March 7, 8 and 9. This hostelry, one of the largest in the world, "belongs" to the Tool Engineers during the convention—no other convention or gathering will use the facilities of this mammoth hotel during the A.S.T.E. Convention. All sessions and all A.S.T.E. meetings will be held here.

and tool cost which will produce more economical results. We find some jobs grossly overtooled, others sadly undertooled for economical manufacture. The session "Economics of Tooling" is arranged to throw as much light as possible on this very important subject, to the end that a formula may be produced which will indicate with reasonable limits the most economical tooling cost when other factors such as volume of production and unit price are known. It may be that separate formulae may be needed for large volume large items, large volume small items, small volume and small items, and small volume of large items. Since speakers covering all phases of this subject will be included in the technical sessions on "Economics of Tooling" it is expected that a definite relationship will be established and the proper formulae may be evolved. Many other subjects are scheduled all relating to this main theme "Economics of Tooling."

As a further example, screw machine tooling has been for the most part an item for consideration by the operator and foreman. Peculiarly, in modern tooling practices the screw machine has been more or less ignored, yet this highly efficient item, the screw machine, is capable of much greater accomplishment if properly studied and tool engineered.

(Continued on Page 46)

PROGRAM 1940 ANNUAL MEETING of the

Schedule of Sessions and Meetings

All Sessions at Hotel New Yorker

MARCH 7

9 A.M. to 2 P.M. Registration—Mezzanine Lobby
9:30 A.M. Board of Directors Meeting—Parlors F and G
10 A.M. Standards Committee Meeting—Parlor E
2 P.M. Technical Session—"Economics of Tooling"—North Ball Room
8 P.M. Technical Session—"Precision Small Gears"—Main Ball Room
8 P.M. Technical Session—"Tooling for Plastics"—North Ball Room

MARCH 8

9:30 A.M. Technical Session—"Screw Machine Tooling"—Main Ball Room
9:30 A.M. Technical Session—"Punches and Dies"—North Ball Room
10 A.M. Membership Committee Meeting—Parlor D
2 P.M. Technical Session—"Tool Engineering Education"—Main Ball Room
5:30 P.M. Cocktail Hour—North Ball Room
7 P.M. Annual A.S.T.E. Dinner and Meeting—Main Ball Room

MARCH 9

10 A.M. Technical Session—"Cutting Tools and Materials"—Main Ball Room
10 A.M. Educational Committee Meeting—Parlor D



THURSDAY, MARCH 7

Technical Session, 2 P.M. to 5 P.M.

North Ball Room

Subject: "Economics of Tooling"

Presiding: RAY H. MORRIS, Chairman, Hartford Chapter No. 7, A.S.T.E. Assisting: W. T. GRAY, Vice-Chairman, New York-New Jersey Chapter No. 14

Speaker: B. G. TANG, General Superintendent, Schenectady Works, General Electric Company
Subject: "Introduction of Symposium Subject" (describing importance of proper production planning)

Speaker: W. T. STEGEMERTEN, Superintendent of Equipment Methods, Westinghouse Electric and Mfg. Co., S. Philadelphia Works
Subject: "Tooling Large Products—Large and Small Quantities"

Speaker: J. M. CRAWFORD, Asst. Superintendent, Generator and Motor Section, General Electric Company
Subject: "Discussion of Paper (Tooling Large Products)"

Speaker: F. E. DARLING, Wage Standards Department, Camera Works, Eastman Kodak Company, Rochester, N. Y.
Subject: "Tooling Small Products—Large and Small Quantities"

Speaker: W. J. PEETS, Asst. Superintendent, Elizabethport Works, The Singer Manufacturing Company, Elizabethport, N. J.
Subject: "Discussion of Paper (Tooling Small Products)"

General Discussion from the Floor



THURSDAY, MARCH 7

Technical Session, 8:00 P.M.

Main Ball Room

Subject: "Precision Small Gears"

Presiding: A. H. MITCHELL, Chairman, Syracuse Chapter No. 19, A.S.T.E.

Speaker: THOMAS TURNER, Manager, Meter Division Westinghouse Electric & Mfg. Co., Newark, N. J.

Subject: "Industrial Requirements of Precision Small Gears"

Speaker: GEORGE H. SANDBORN, Sales Engineer, The Fellows Gear Shaper Company, Springfield, Vt.

Subject: "Discussion on Shaping Method of Producing Precision Small Gears"

Speaker: ROBERT A. HORNER, Sales Manager, Machine and Small Tool Division, Barber-Colman Company, Rockford, Ill.

Subject: "Discussion on Hobbing Methods of Producing Precision Small Gears"

Speaker: ARNOLD THOMPSON, Chief Tooling Engineer Canadian Acme Screw & Gear Co., Ltd., Toronto, Ontario, Canada

Subject: "Generating Precision Small Gears"

Discussion from Floor



THURSDAY, MARCH 7

Technical Session, 8:00 P.M.

North Ball Room

Subject: "Tooling for Plastics"

Presiding: STANLEY S. JOHNS, Chairman, Baltimore Chapter No. 13, A.S.T.E.

Speaker: JOE STEWART, General Foreman Plastic Department, Ford Motor Company, Dearborn, Mich.

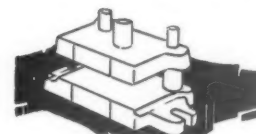
Subject: "Tooling for Plastics"

Speaker: W. B. ROSS, Diemolding Corporation, Canastota, N. Y.
Subject: "Discussion on Moulding Processes for Resin Plastics"

Speaker: F. W. MCINTYRE, Reed-Prentice Company, Worcester, Massachusetts.

Subject: "Discussion on Injection Moulding of Cellulose Plastics"

Discussion from Floor



FRIDAY, MARCH 8

Technical Session, 9:30 A.M.

North Ball Room

Subject: "Punches and Dies"

Presiding: E. W. ERNEST, Chairman, Schenectady Chapter No. 20, A.S.T.E.

Speaker: W. T. FORDE, Manufacturing Supervisor, International Business Machines Corporation, Endicott, N. Y.

Subject: "Punches and Dies for Small Products"

Speaker: GORDON L. REED, Chairman, Central Pennsylvania Chapter No. 22, A.S.T.E., Chief Engineer, York Corrugating Company, York, Pa.

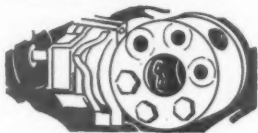
Subject: "Punches and Dies for Large Products"

TOOL ENGINEERS - - AMERICA'S PIONEERS on

AMERICAN SOCIETY of TOOL ENGINEERS

Speaker: FRANK D. O'BRIEN, Tool Department Master Mechanic,
Eastman Kodak Camera Works, Rochester, N. Y.
Subject: "Discussion of Subject Papers"

Discussion from Floor
Cocktail Hour—North Ballroom



FRIDAY, MARCH 8

Technical Session, 9:30 A.M.
Main Ball Room

Subject: "Screw Machine Tooling"

Presiding: JOHN R. LYNCH, Chairman, Elmira Chapter No. 24,
A.S.T.E.

Speaker: HAROLD P. BERRY, Editor "Screw Machine Engineering"
Senior Tool & Gage Designer, Naval Gun Factory, Washing-
ton, D. C.

Subject: "The Need for Top Rake on Form Tools"

Speaker: M. W. TAYLOR, Foreman, Automatic Screw Machine De-
partment, Wright Aeronautical Corporation, Paterson, N. J.
Subject: "Screw Machine Tooling On Aircraft Engines"

Speaker: C. C. STEVENS, Mechanical Superintendent, New Depart-
ment Division, G.M.C., Bristol, Conn.

Subject: "Tooling of Multiple Spindle Automatics"

Speaker: L. B. GILBERT, Manager, Time & Methods Department,
Columbus-McKinnon Chain Corporation, Tonawanda, N. Y.
Subject: "Discussion of Papers Presented"

Discussion from Floor



FRIDAY, MARCH 8

Technical Session, 2:00 P.M.
Main Ball Room

Subject: Symposium on "Tool Engineering Education"

Presiding: H. D. HALL, Chairman, New York-New Jersey Chap-
ter No. 14, A.S.T.E.

Speaker: CLIFFORD S. STILWELL, Executive Vice President, The
Warner Swasey Company, Cleveland, Ohio.

Subject: "Industrial Requirements In Tool Engineering Education"

Speaker: J. W. BARKER, Dean of College of Engineering, Columbia
University, New York, New York

Subject: "University Viewpoint of Tool Engineering Education"

Speaker: E. L. BOWSER, Superintendent of Schools, Toledo, Ohio.
Subject: "High School Viewpoint of Tool Engineering Education"

Speaker: THOMAS P. ORCHARD, Instructor, Technical Evening
Classes, Paterson, N. J.

Subject: "Vocational Viewpoint of Tool Engineering Education"

Speaker: DON FLATER, Works Manager, Chrysler Corporation,
Chrysler Division, Detroit, Mich.

Subject: "Discussion of Subject Papers"

Discussion from Floor



FRIDAY, MARCH 8

ANNUAL DINNER AND MEETING

Annual Dinner, 7:00 P.M., Main Ball Room
Music Dinner
(Admittance by Ticket Only)

Annual Meeting, 8:00 P.M.

Presiding: JAMES R. WEAVER, President A.S.T.E., Westing-
house Electric & Mfg. Co., Director Equipment, Inspection and
Test, Society Reports.

Presentation of Membership Cup

Introduction and installation of new A.S.T.E. national officers

Speaker: JOHN YOUNGER, Chairman A.S.T.E., Fact Finding Com-
mittee, Professor of Engineering, Ohio State University

Subject: "Third Report of Fact Finding Committee on Causes of Un-
employment"

Speaker: JAMES R. WEAVER, President A.S.T.E.

Subject: President's Address—"The A.S.T.E., Past, Present and
Future"



SATURDAY, MARCH 9

Technical Session, 10:00 A.M.
Main Ball Room

Subject: Symposium on "Cutting Tools and Material"

Presiding: JOHN A. STRECKER, Chairman, Philadelphia Chap-
ter No. 15, A.S.T.E.

Speaker: E. S. CHAPMAN, General Works Manager, Chrysler Cor-
poration, Plymouth Division, Detroit, Mich.

Subject: "Industry's Requirements in Cutting Tools and Materials"

Speaker: L. C. GORHAM, President, Gorham Tool Company, Detroit,
Michigan

Subject: "High Speed Steel Group of Cutting Tools and Materials"

Speaker: W. G. ROBBINS, President, Carboly Company, Inc., De-
troit, Mich.

Subject: "Carbide Group of Cutting Tools and Materials"

Speaker: A. H. d'ARCAMBAL, Consulting Metallurgist, Pratt &
Whitney Division of Niles-Bement-Pond Company, Hartford,
Conn.

Subject: "High Speed Cutting Tools, Their Selection, Use and Care"

Discussion from Floor

LIMITLESS INDUSTRIAL FRONTIERS

MACHINES AND TOOL ENGINEERS

Make Jobs

WRITTEN ESPECIALLY FOR THE TOOL ENGINEER

WE Tool Engineers are subject to the same suspicion of doing away with jobs as the machines for which we are responsible, and for the same reasons. There is unemployment, and there are men who once did work now performed by a machine. The unthinking conclusion is that machines, and the men who create and utilize them, are to blame. It is not enough that we know the gross injustice and untruth of this accusation—we must be prepared to meet hasty generalizations with conclusions drawn from all the facts. Here are those facts:

Do technological advances take jobs, or do they make jobs? It all depends on how you look at it. With but one figurative eye open, you might see that there are certain occupations in which employment is declining. There are fewer blacksmiths, home dressmakers and teamsters. Figures taken from the

last two census years show that in these and nineteen other principal declining occupations, there were 807,222 fewer jobs in 1930 than in 1920. (See Table 1.)

With both eyes open, however, you would also see that there are occupations which are growing so much faster that almost three new jobs have replaced each one lost in the declining occupations. Mechanics, barbers, builders, painters, truck driver and others in nineteen principal growing occupations increased their number by 2,264,548 during the same period. (See Table 2.) The total net increase in gainful employment was 7 million, from 41.8 million in 1920 to 48.8 million in 1930—indicating that on the whole, technological advances created new jobs faster than old ones disappeared.

Did employment opportunities keep pace with population growth? The answer is yes, and there are no two ways of looking at it. According to the United States census, only 27 out of every 100 persons were gainfully employed in 1830. In 1930, 40 out of every 100 persons were gainfully employed. Thus there has been almost a 50% increase, during these 100 years of rapid mechanization, in the proportion of our population gainfully employed.

But let's bring the picture more nearly up to date. In 1937, there were fifteen industries that did not even exist sixty years ago, and that owe their existence to machinery. These industries employed directly a total of 1,529,100 persons. (See Table 3.) And the employment figures only suggest the tremendous benefits these industries have bestowed through indirect employment.

Stepping back a bit, for better perspective, we see that the normal trend, for well over sixty years, has been away from an agricultural, handicraft society. Manufacturing has increased the number of people employed in distributing and service occupations. Between 1870 and 1930, the census shows that while the proportion of our working population engaged in manufacturing rose from 21% to 29%, the increase in those employed in trade in transportation was from 10% to 29%. The number of professional people doubled, because our standard of living was raised by technological advances.

Employment in agricultural occupations, however, dropped between 1870

GOING UP!

Table 2—Net Increase between 1920 and 1930 in 19 Principal Growing Occupations:

Automobile factories	40,793
Barbers, hairdressers and manicurists	158,079
Bakers	42,860
Chemical and allied industries	47,051
Clay, glass and stone industries	10,908
Electrical engineers	30,760
Engineers (stationary), cranimen, etc.	36,980
Foremen and overseers (manufacturing)	30,376
Garage workers	35,243
Laborers (building, general)	428,945
Managers and officials (manufacturing)	62,806
Mechanics	356,512
Oil and gas well operatives	19,674
Oilers of machinery	6,598
Painters, glaziers, varnishers, etc.	205,899
Plumbers and steam fitters	31,096
Structural iron workers (building)	10,130
Truck drivers and chauffeurs	687,000
Upholsterers	22,847
	<hr/> 2,264,548

Table 1
Net Decrease between 1920 and 1930 in 19 Principal Declining Occupations:

Apprentices in building and hand trades	34,000
Apprentices to dress makers	2,200
Apprentices (miscellaneous)	26,000
Blacksmiths	74,000
Boilermakers	25,000
Coopers	8,000
Draymen and teamsters	309,000
Dressmakers (in home)	75,000
Firemen (in manufacturing industries)	16,000
Furnacemen, puddlers, etc.	5,000
Glass blowers	6,000
Jewelers and silversmiths	900
Millers, grain	7,300
Milliners and millinery dealers	29,000
Millwrights, tool makers, die setters	134,000
Moulders and founders	18,000
Shoemakers and cobblers	2,500
Stable hands	12,322
Tailors	23,000
	<hr/> 807,222

GOING DOWN!

and 1930, from 54% to 22% of the working population. In spite of this decline, and of a tripling of population, total employment increased four times.

The effect of depression upon employment has been greatest in occupations using little or no machinery, which have lagged behind in technological development, such as building construction. Building has been not only one of the most depressed industries, but one of the least changed in its manufacturing methods. The 1937 census of unemployment showed that in the independent hand trades employment was off 26%, although the average for all occupations was off only 14%.

Many industries, with the impetus of mechanization, showed employment gains right through the depression. Aircraft manufacturing, for example, employed during the 1930s seven times more persons than it did from 1923 to 1925. The radio, phonograph, office machine and cash register industries provided more jobs during the depression than before.

Science and invention, it appears, bring about an increase in the total proportion of our population employed in manufacturing, distributing and service occupations, which have unlimited possibilities for expansion. A declining

proportion remains in agricultural and similar occupations, producing goods with relatively inelastic demand. But, since the increase in manufacturing and service industries more than offsets the losses in other occupations, there is normally a net increase—keeping pace with growth of population—in total employment opportunities.

Employment gains in agricultural pursuits depend for the future on new industrial uses for farm commodities. A glimpse into the future reveals these possibilities: roads of cotton; gasoline from sea-sand; sugar into building material; rubies from peach pits; corn into soap, rubber substitute, glue and industrial alcohol; cottonseed into smokeless powder, artificial leather and varnish; wood and cotton into sponges; cheese into artificial wool.

Where Do We Go From Here?

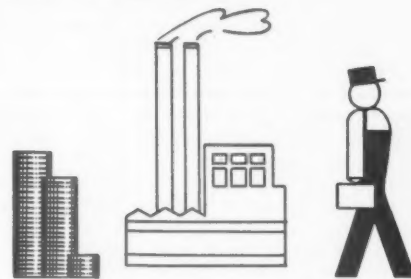
Absorption of the present unemployed into manufacturing industries like ours, and into the service industries, will not be solved simply by progressive shortening of the work week—not unless, by a more than proportionate increase in productivity per worker, we maintain our standard of living. This is a job for Tool Engineers and the efficient use of machinery. Lower prices, the key to increased consumption and production, depend on our constantly decreasing the labor cost per unit of output.

Here come more figures. But we want facts, with which to fight fiction!

The work week in American industry averaged 56.8 hours in 1899, according to the National Industrial Conference Board. By 1937, it had dropped to 39.1 hours. However, a decline from the 1929 average of 48.3 hours has been greatly out of production to increased efficiency. The Machinery and Allied Products Institute has estimated that if the drop in production had been proportionate to hours worked, and employment increased at the same rate as population—then we would in 1937 have had 31% less goods per capita to consume than in 1899.

Higher wages, too, depend on machinery, which enables workers to produce more. In 25 major manufacturing industries, average hourly earnings rose from 25c an hour in 1914 to 71.3c in 1938. However, the decline in the cost of living, accounted for by price

MORE VALUE • MORE PRODUCTION MORE JOBS



Product		Price	Production	Employees
Radios	1924	\$275.00	\$ 81,000,000	15,461
	1937	65.00	122,900,000	48,343
Cameras	1927	5.00	90,800,000	12,120
	1937	1.00	111,877,000	18,450
Typewriters & Bus. Mach.	1924	135.00	143,500,000	28,969
	1937	115.00	183,000,000	47,070
Automobiles	1927	977.00	2,700,705,743	370,000
	1937	704.00	2,971,027,641	517,000
Refrigerators	1927	350.00	77,123,088	11,285
	1937	170.00	363,788,412	50,623
Washing Machines	1927	140.00	74,951,000	7,789
	1937	75.00	69,888,850	9,302

reductions made possible by machinery, has increased the purchasing power of weekly as well as of hourly earnings—so much so, in fact, that the purchasing power of weekly earnings is higher than ever before, even in 1929.

Real income depends on hours, hourly wages, and productivity. And consumption depends on total production. Which brings us to an important principle:

Price Reduction—The Way Out

There is only one fair and efficient means of distributing the benefits of our economic system more widely over the whole population. Not redistribution of wealth. Not shorter hours. Not higher wages. Not crop destruction, limitation of production, or price maintenance. Not higher taxes for cash benefits or "make-work." Price reductions,

passing on to all groups the expanded purchasing power created through the more efficient production of a larger volume of goods—that is the practical answer. Price reductions make it increasingly possible for technology to further enlarge the production and distribution of goods wanted by all consumers.

Less than 25% of our nation's families are supported directly by manufacturing industries, the major source of wages. Technological advances should be passed on to all consumers through price reductions. Farmers, for instance, do not benefit by higher factory wages if they must pay the same prices for manufactured products as paid by those who received the wage increases. This is also true of merchants, professional men and those in service occupations who do not receive their income from factory wages.

It's up to us, by making possible price reductions, to further raise our standard of living. The Brookings Institution in its studies of the problem found that an increase in the production of all kinds of consumer goods and services of between 70% and 80% was necessary even at the peak of prosperity in 1929—to satisfy the wants of those millions of our population whose standard of living, even in 1929, was below the requirements of health and efficiency.

But, the Brookings Institution points out, "In emphasizing the need of increasing consumption, we must not

Direct Employment in 1937 by 15 Industries Made Possible by Machines

Automobiles and parts.....	513,800
Electrical machinery and supplies.....	333,700
Rayon products.....	153,000
Gasoline and oils.....	100,500
Rubber tires and inner tubes.....	75,600
Radios and phonographs.....	58,700
Mechanical refrigerators and refrigerating.....	50,600
Tin cans and tin ware.....	39,000
Aircraft and parts.....	32,100
Ice cream.....	32,100
Cash registers and computing machines.....	31,000
Aluminum products.....	30,300
Typewriters and materials.....	26,900
Electric lighting equipment.....	26,600
Electric railroad cars.....	25,200
	1,529,100

(Continued on Page 42)

RECLAMATION of CUTTING OILS by CENTRIFUGALS

By
H. P. WILKINSON
CENTRIFUGAL SALES DIVISION
THE NATIONAL ACME COMPANY

A CENTRIFUGE is a machine designed to subject material, held in it, or being passed through it, to centrifugal force. A batch centrifuge holds material so that it may be subjected to centrifugal force. A continuous centrifuge passes material in a steady stream through a part of the centrifugal apparatus, where it is subjected to centrifugal force and continuously discharges the separated components. The earliest centrifugal machine of which we have any definite record was developed by textile workers to assist in wringing excess dye from fabrics. This is the direct antecedent of our well-known chip wringers and salt dryers. The next commercial application came after the bowl or rotor of the centrifuge had been altered to allow for skimming of a light liquid from the surface of a heavy liquid. This was the origin of the cream separator. These machines were developed sometime about 1870 to 1880, but so far as I know, there had been no industrial application of centrifugal separators until sometime around 1910 to 1915, when cream separators were tried for the recovery of valuable oil from the bottom settlings of field oil tanks in Texas. After this problem was successfully solved, the spread of continuous centrifuges through industry has been very rapid.

The Centrifuge

A centrifuge may be described as a mechanical device for magnifying the force of gravity and applying it to useful work. You have frequently observed the effect of gravity in such phenomena as when a river loses its muddy appearance following a flood and again where the sewage from an industrial district runs out into a river or harbor with oil rising to the surface. These mixtures tend to separate under natural conditions and the same mixtures will separate more rapidly under centrifugal force. Many conditions affect the rate of separation or the rate of settling and the Stokes law affords a valuable starting point for a study of these conditions. Originally intended to express the rate of settling of solid or liquid particles in air, it also expresses the conditions that control the rate of

settling of solid or liquid particles through liquids. From this it can be developed that centrifugal force in terms of gravity varies as the diameter of the centrifugal bowl and as the square of the R.P.M. It is shown by the formula; F equals .0000284 times $M \times R$ squared, where F equals centrifugal force expressed in terms of gravity, M equals the inner radius of the bowl in inches and R equals the R.P.M.

So much for theory—since it is not my purpose to give you a scientific discussion from a mathematical viewpoint, but rather a practical illustration of how centrifugal force applied by means of centrifuges may help you in solving some of your problems. You will find it easy to understand just what a centrifuge is and how it works if we start in with a simple settling trough and develop a centrifuge from it.

The Principle

This illustration, Fig. 1, shows a simple settling trough through which dirty water is flowing. The rate of flow through the trough is slow and the dirt settles out and remains on the bottom of the trough, while clear water overflows from the opposite end. Let us assume some of this dirt changes in nature and after the settling trough has been operating successfully for some time, there is some sawdust or charcoal dust entering with the water. Obviously this material would float along the surface and overflow at the other end of the trough with the water. Now if a dam is placed across the surface of the water, Fig. 2, it will hold back these light solids. If instead of sawdust or light solids of that nature, the light contamination is oil, the dam will still be useful, but eventually the amount of oil against the dam will increase until it will flow under the dam.

In illustration, Fig. 3, we find that it is possible to adjust the height of the dam to such an elevation that a layer of water of a certain depth will just balance a layer of oil plus a layer of water superimposed on each other as shown in this illustration. When this balance is established, there will be a continuous overflow of oil from the extension at the front of the dam and water from the end of the trough. It



Figure 1

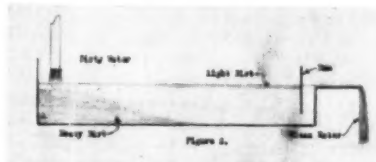


Figure 2

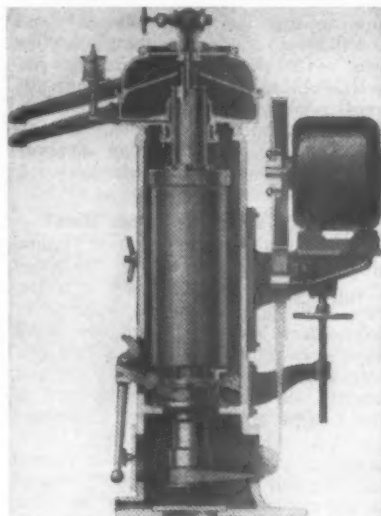


Figure 4. "Positive" Clarifier—Sectional View.

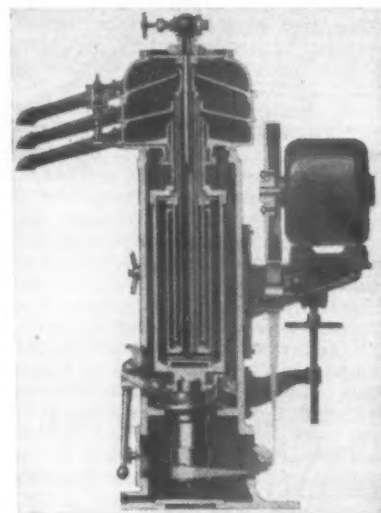


Figure 5. "Positive" Separator—Bowl shown in Section.

is now a continuous separating tank. Assume that this flat, level, comparatively shallow tank is rolled into a cylinder and that the cylinder is rotated.

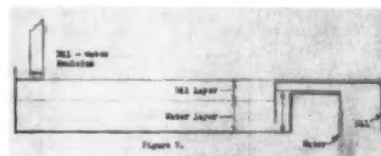


Figure 3

CUTTING FLUIDS

By
PROFESSOR O. W. BOSTON
DEPARTMENT OF METAL PROCESSING
UNIVERSITY OF MICHIGAN

CUTTING fluids comprise liquids, solids, and gases, which are applied to the tool point to facilitate the metal cutting operation. Millions of gallons are used annually to accomplish any one of a number of purposes, singly or in combination, such as to increase the tool life for a given cutting speed, prevent distortion of the work while it is being machined, reduce power consumption, break up the chips and help remove them, and, improve the smoothness of the machined surface. The performance of a cutting fluid, therefore, must be based on its success for each particular application to a specific metal, tool, and cutting operation.

The properties desired in any cutting fluid may be summarized as follows:

1. High heat absorption, that is, high thermal conductivity.
2. Good lubricating qualities.
3. High flash point, that is, not liable to spontaneous combustion and the hazard of fire.
4. Freedom from precipitation of solids at ordinary working temperatures.
5. Stability, so as not to oxidize in the air or give rise to gummy deposits on the sliding surfaces of the machine.
6. Components not easily becoming rancid.
7. No unpleasant odor when heated or after continued use.
8. Not injurious to the skin of the operator either directly as from high acidity, or indirectly by contamination.
9. Not injurious to the bearings of the machine, even if mixed with the machine lubricants or applied directly to the bearings.
10. Non-corrosive to the work and machine and a rust preventive.
11. Fairly transparent so that the cutting action of the tool may be observed.
12. Low viscosity to permit free flow from the work back to the storage tank, and to drip from the chips.
13. Low price and readily obtainable.

Types of Cutting Fluids Used

The many types of cutting fluids in use may be classified as follows:

1. Air used as a blast or induced draft.
2. Aqueous solutions, such as plain water or water containing a small percentage of an alkali.
3. Emulsions of a soluble oil or paste. The soluble oils usually consist of a mineral oil, an animal or vegetable oil, plus an emulsifier, as soap. The mineral oils usually used in the United States consist of the Gulf-coastal or mid-continent products. Lard, tallow, or synthetic fats are used for the fatty oils. In some products, the fatty oils are sulphurized with flowers of sulphur or sulphur monochloride. The emulsifiers

consist of Twitchell base, such as turkey red oil; di-ethylene glycol; saponified phenol; saponified naphthenic acids, usually used up to 15 per cent; or alcohol. Various trade compounds, using pure organic compounds and non-organic compounds either in combination with mineral oils or used alone, also are used as soluble oils.

Cutting pastes are sometimes used in which a saponified mineral oil very high in soap content to make it into a grease-like consistency is used. These are mixed with water to form emulsions for use.

4. Oils include straight oils, compounded oils, sulphurized oils, and chlorinated oils. Straight cutting oils include mineral oils of any desired viscosity, straight fatty oils, and compounded oils. Lard oil, either as No. 1 or as prime lard, is the most commonly used fatty oil, although many synthetic fats are used. The compounded oils consist usually of a mineral oil to which is added from 10 to 30 per cent fatty oil.

Sulphurized oils are now being used to a considerable extent. They consist of a sulphurized straight mineral oil in which case the active sulphur content is not over 3 per cent. This oil is used as prepared but may be blended further with a light mineral oil for some work. Sulphurized base oils in which the fatty oil, such as lard oil, is sulphurized with from 8 to 12 per cent of active sulphur added to it to form a base. For use, the high viscous base oil is blended with 5 to 20 parts of a straight mineral oil of a viscosity such as 110 Saybolt seconds at 100 deg. F. to suit the requirements. This resulting blend is quite transparent and has a low viscosity.

Chlorinated mineral oils of a stable variety have been found to have properties favorable to many metal cutting operations.

The Performance of Cutting Fluids

The influence of cutting fluids on the torque¹ of a 1/4-inch diameter twist drill, when operating at a speed of 60 f. p. m. and a feed of 0.015 inch per revolution, in each of nine metals is shown in Fig. 1. Eleven cutting fluids were used as designated in the legend of Fig. 1. The highest curve, for a nickel-chromium steel known as S.A.E. 3150 in an annealed condition, shows that the highest torque is obtained with the mineral oil containing 5 per cent oleic acid, No. 9. The next highest value is obtained with cutting fluid No. 1, dry cutting. The lowest value of torque is obtained with the sulphurized mineral oil No. 10; with the sulphurized base oil, No. 11; second best, and the borax water, No. 2, third lowest. It is interesting to note

that for the other steels, the curves are somewhat, although not exactly, similar to that for the S.A.E. 3150 steel. The S.A.E. 1112 steel, which is a Bessemer sulphur screw stock steel, has practically a constant torque at 70 foot pounds for all cutting fluids. The borax water, No. 2, increases the torque, while the two sulphurized oils, No. 10 and 11, reduce it, but not to the same extent as for the non-sulphur steels above. The cutting fluids react quite differently for the other four metals at

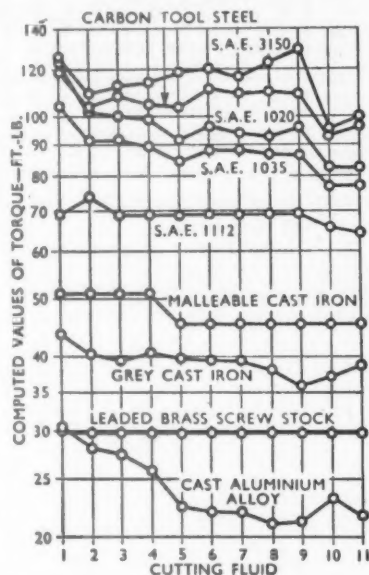


Fig. 1. Values of torque for 1/4-inch diameter drill operating at 0.015-inch feed and 60 f.p.m., when cutting several ferrous and non-ferrous metals with eleven commonly used cutting fluids. The cutting fluids are as follows: No. 1—Dry cutting; No. 2—Water containing 1 1/2 per cent borax; No. 3—Emulsion of 1 part soluble oil to 50 parts water; No. 4—Emulsion of 1 part soluble oil to 10 parts water; No. 5—A No. 2 lard oil; No. 6—A light mineral oil; No. 7—A heavy mineral oil; No. 8—Oil No. 6 plus 10 per cent lard oil; No. 9—Oil No. 6 plus 5 per cent oleic acid; No. 10—A sulphurized mineral oil; No. 11—A sulphurized lard-mineral oil.

the bottom of Fig. 1. From this it is clear that the performance of one cutting fluid on a given metal is not a criterion of its comparable performance on another material.

The thrust curves for the same materials plotted over the cutting fluid numbers are shown in Fig. 2. Again, no similarity is seen between the curves of any two metals.

It also has been found² that the quantity of the cutting fluid delivered to the point of the drill will influence the value of the torque and thrust. The torque is increased as the cutting fluid is reduced for all of the cutting fluids. The thrust, however, is increased for cutting fluids 5, 6, 7, 8, and 9 (see legend of Fig. 1), but is reduced for cutting fluids 2, 3, 4,

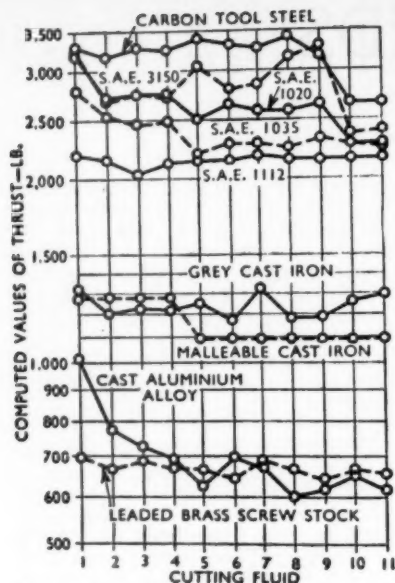


Fig. 2. Values of thrust corresponding to the torque values shown plotted in Fig. 1.

and 11. It remains practically constant for cutting fluid No. 10.

The results of other experiments⁸ are shown in Fig. 3 to illustrate for the same eleven cutting fluids that the tangential cutting force in pounds is a

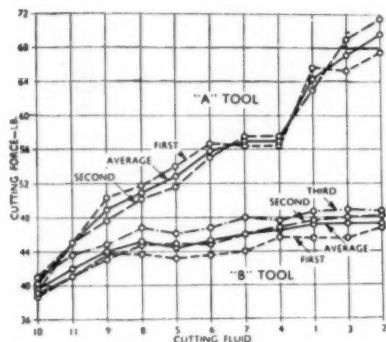


Fig. 3. Tangential cutting force in turning annealed S.A.E. 3150 steel, using the cutting fluids referred to in Fig. 1. Cutting fluids are arranged in order of increasing force on tool A.

function of the shape of the tool. Two tools, A and B, were used. Tool A has a 15-deg. back rake angle and no side rake, while tool B was similar to A except that it had 8-deg. back rake and 14-deg. side-rake angle. The cutting speed was 66 f.p.m., the feed 0.0069 inch, and the depth of cut 0.100 inch. The stock was 1.8 inches in diameter. This shows that the saving in power through the use of cutting fluids is greater for tool A than for tool B.

In Fig. 4, results⁹ show the time in minutes to cut off a bar of metal 1½ inches square in a power hacksaw with a blade 1 inch wide, 0.065 inch thick, with six teeth per inch, producing a kerf of 0.082 inch. The set of the teeth was right, left, two straight, etc. The feeding pressure was 119 pounds. The

cutting fluids, indicated by number, are the same as those described in Fig. 1. It is seen that dry cutting, cutting fluid No. 1, requires the greatest cutting time for all metals. The water compounds, No. 2, 3, and 4, give nearly equal values, slightly lower than those for dry cutting, for all of the metals. The two sulphurized oils, No. 10 and 11, caused the saw to cut fastest on all metals.

The same eleven cutting fluids were used further to lubricate a bearing in order to determine the value of each as a lubricant.² Dry lubrication was replaced with clear water. The bearing testing machine rotated the journal in a bearing. A new combination of journal and bearing was used for each test. The journal diameter was 1.00 inch, and the bearing was 1.007 inches in diameter and 1 inch long. The journal was rotated at 100 r.p.m. The load was increased at a rate of 1,000 pounds every ten seconds. The beam load on the 15.75-inch-long lever arm was plotted over the applied pressure for each of the cutting fluids, and it was found that the lowest beam load was for water until a pressure of about 9,000 pounds was reached, when the beam load rapidly increased and bearing seizure took place at about 10,000 pounds pressure. Lard oil, No. 5, gave a low beam load, but seizure occurred at a pressure of approximately 13,000 pounds. The maximum beam loads occurred for oils 6, 9, 7, and 10. Seizure occurred for cutting fluids 6, 9, and 7 at relatively low pressures. For No. 10 seizure occurred at the highest beam load of 223 pounds and a pressure of 14,000 pounds. The sulphur in the plain mineral oil permits the generation of considerable friction and heat, but prevents seizure of the bearing. It is interesting to note that the beam load for a given pressure for the sulphur-base oil, No. 11, was less for most pressures than were those for No. 10. The fat of this oil presumably

reduces the friction, although seizure occurs for a beam load of only 200 pounds at a pressure of only 11,000 pounds. This characteristic represents the main difference between the blended sulphurized base oils and the sulphurized plain mineral oils.

Results of careful tests have shown that the straight line curve representing cutting speed as a function of tool life for a given set of conditions, in turning, as plotted on log-log paper, may be changed in its vertical position on a scale, as well as in slope from the horizontal, if one cutting fluid is replaced by another, with all other factors remaining constant. These factors cover the type and material of tool, tool shape, size and shape of cut, cutting process as turning, drilling, broaching, grinding, milling, threading, and the analysis and structure of the material cut. Data are shown below to substantiate this statement.

When turning 3½ per cent nickel steel,⁵ such as S.A.E. 2345, in an annealed condition, with high-speed-steel tools having 8-deg. back rake, 14-deg. side rake, 15-deg. side-cutting edge angle, and ¼-inch nose radius, with a depth of cut of 0.050 inch and feed of 0.0255 inch, it was found that the cutting speed for a 60-minute tool life was as follows:

TABLE 1 Cutting Speeds for a 60-Minute Tool Life

Depth of cut, inches.....	0.050	0.100
Feed, inches	0.0255	0.0125
	Cutting Speed, f.p.m.	
Cutting Fluids:		
Dry cutting	83	97
Sulphurized plain mineral or sulpho-chlorinated oil	89	120
Plain mineral oil (viscosity 110 deg. at 100 deg. F.)	97	112
Emulsion of 16:1 strength.	103-105	120
Borax water	105	125
	26.5%	22.4%
Increase over dry cutting...	(22 ft.)	(28 ft.)

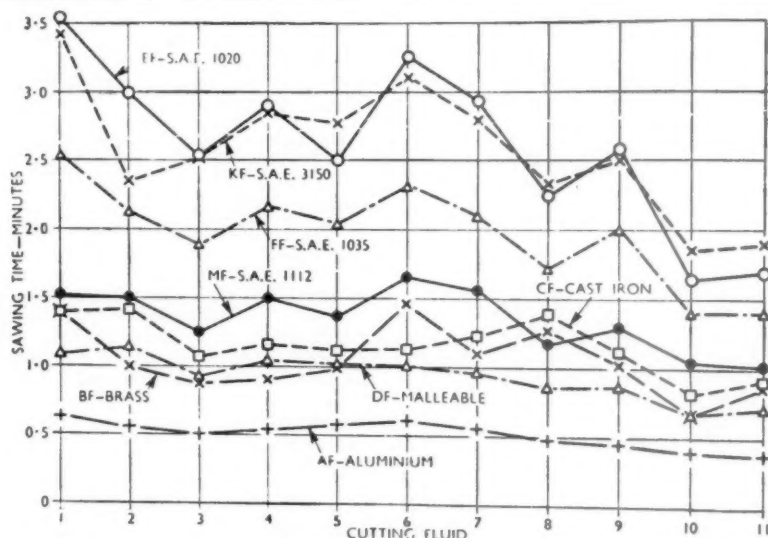


Fig. 4. The time to saw off 1½-inch square sections of each of eight metals in a power hacksaw with the cutting fluids listed in Fig. 1.

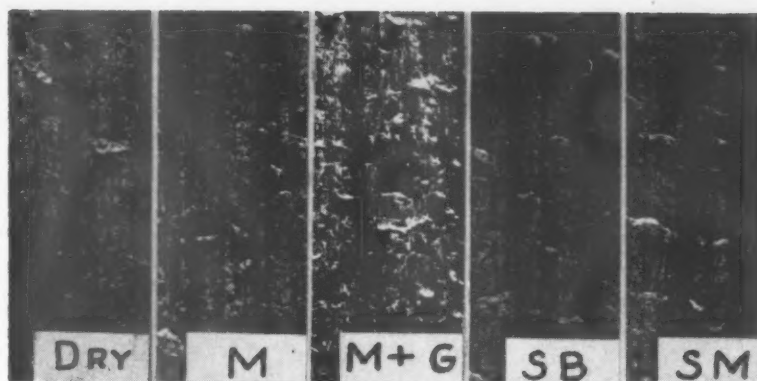


Fig. 5. M = mineral oil (5c), 100 vis at 100 deg. F. M + G = M + 2 oz. of colloidal graphite (Oildag) per gal. SB = sulphur base oil blended with 8 parts of M. SM = sulphur mineral oil (110) vis 110 at 100 deg. F. Surface finish when cutting S.A.E. 3140 steel annealed, with several cutting fluids. Depth of cut 0.015 inch and feed 0.0125 inch. Cutting speed 164 f.p.m. Tool shape 8-14-6-8-15- $\frac{1}{2}$. 40X.

The increase of speed for dry cutting gained by changing the shape of cut is 17 per cent.

These various lines for the cut of 0.050 inch by 0.0255 inch were represented by the equation $VT^{1/9.6} = \text{a constant}$ for all cutting fluids except the sulpho-chlorinated mineral oil which was represented by the equation $VT^{1/7} = 163$. For the cut of 0.100 inch by 0.0127 inch, the lines were represented by the equation $VT^{1/7.3} = \text{a constant}$ for dry cutting, water, and the emulsions, $VT^{1/7.8} = 192$ for plain light mineral oil, and $VT^{1/8.4} = 193$ for the sulpho-chlorinated mineral oil.

When turning an S.A.E. 3140 steel normalized and annealed with another type of high-speed steel but of the same shape as that given above,⁵ the cutting speeds V_{90} and V_{200} , that is, the cutting speeds for a 20- and a 200-minute tool life, respectively, were as follows:

Cutting Fluid	V_{90}	V_{200}
Dry cutting	110	83
Plain mineral oil	118	89
Emulsion of 1:16	123	92
Sulphurized mineral oil	126	97
Borax water	129	97

The increase in speed is 17.2 and 16.9 per cent, respectively. Most of these lines are represented by the equation $VT^{1/6.8} = \text{a constant}$.

It has been observed in many tests that the cutting fluid which gives the longest tool life does not necessarily give the lowest tangential cutting force at the same time. Some tests give definite data to the contrary.

To obtain a superior finish on any machined surface, the size of the built-up edge should be reduced. The machinist accomplishes this by increasing the cutting speed, reducing the size of cut, grinding the tool to keener cutting edges and greater rake, and by applying a cutting fluid. Results of numerous tests suggest that the cutting fluid itself has the least influence on finish of all factors named for normally high cutting speeds. See Fig. 5. For low cutting speeds, as in broaching and threading, the cutting fluids, particularly the sulphurized base oil, do produce superior

surface finishes.

A cutting tool removes a chip of ductile metal as illustrated in Fig. 6. The chip slides over the built-up edge formed on the tool face from the metal being machined. The body of this built-up edge is more or less stationary on the tool point, although particles of the leading edges slough off and become attached to the bottom of the chip and to the machined surface. These sloughed-off particles form rough waves on the machined surface, causing it to appear like the surface of a file. The built-up edge is forced into the metal by a pressure of 250,000 to 450,000 pounds per square inch on the tool. It is not clear how a cutting fluid possibly could penetrate to the leading point of the built-up edge to lubricate the chip as it slides over the built-up edge and over the surface of the tool. It is seen in Fig. 6 that the cutting edge of the tool does not form the machined surface, and so the quality of the surface must be a function of the size and shape of the built-up edge, rather than the keen cutting action of the tool.

Built-up edges similar to that in Fig. 6 have been formed under identical conditions, except with different cutting fluids applied to the tool. They have been checked, photographed, and measured. The thickest built-up edge was obtained with lard oil, and the thinnest with a mineral oil plus colloidal graphite, carbon tetrachloride, and a 1:20 emulsion. Average values were obtained for dry cutting, water, high- and low-viscosity mineral oil, sulphurized mineral oil, and the sulphurized mineral oil plus chlorine. The maximum variation for all of the oils was less than 10 per cent of the total thickness.

The temperature developed at the tool point while turning various metals has been found, by the tool-work thermocouple method and the tool thermocouple method, to vary almost directly with the speed for a given cutting condition. When a cutting fluid is applied in turning steel, however, all other factors remaining constant, the temperature when cutting dry is highest, when cutting with an oil is somewhat lower,

and when cutting with water is the lowest. It is believed that tool life in turning is a direct function of temperature, so that it would be expected that the cutting fluid having the highest refrigerating property would produce the longest tool life. At the same time, it is reasonable to expect that an oil, as a result of its good lubricating properties, might reduce the heat generated at the tool point and, even in spite of its lower thermal conductivity, keep the temperature at the tool point lower than when the better refrigerant is used, and, as a result, provide longer tool life. Experimental data confirm this belief in some specific tests, but fail to confirm it in others. Presumably, lubrication and thermal conductivity are both of importance. It is believed that the ratio of lubrication to cooling varies for different specific applications. At the present time sufficient data are not available to establish a satisfactory rule governing this relationship.

Practical Application

In general, the application of cutting fluids varies considerably from plant to plant. Cutting fluids are selected for the type of metal being cut, the operation under consideration such as grinding, rough turning, broaching, and threading, and the type of machine tool being used, such as a simple turret lathe, or a complicated automatic screw machine.

Various surveys to set forth the commercial application of cutting fluids have been made. (See Bibliography No. 7, 8, and 9.) Because of the very many variables involved, including that of the human element, the results of these surveys are similar in only a general way.

Air is often applied as a suction or blast to cutting operations such as turning or boring cast iron or on surface grinders and polishing machines. Its main purpose is to remove small chips and dust, but some cooling also is obtained.

(Continued on Page 56)

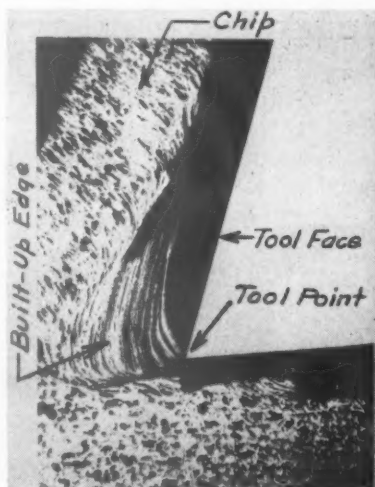
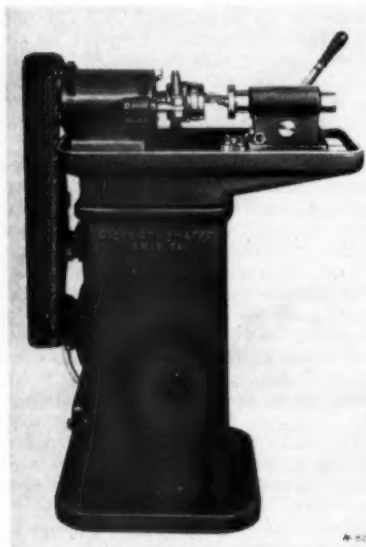


Fig. 6. A built-up edge formed in annealed low-carbon steel by a tool with a 15-deg. rake operating at a depth of cut of 0.020 inch and a cutting speed of 120 f.p.m. A mineral oil containing sulphur and chlorine was used. 25X.

New Production Equipment

A vast array of new production equipment is being introduced continually. The tempo of production as well as the machines and new tools that set the modern production pace is something every Tool Engineer should keep up with. On these pages appear only selected items, brand new, for your quick perusal.

A new Hydraulic Universal Grinding Machine, (Model ER) recently announced by Cincinnati Grinders, Inc., includes many unique features thoroughly tested in application, yet new and different. The design is based on



a study of customer requirements and on the often neglected possibilities of helping average operators do craftsmen's work of precision grinding in the shortest time. Hidebound tradition has been disregarded, and the machine is completely new from floor line to top of wheel guard. The machine has 12" swing and is obtainable in between-center lengths of 24", 36", 48" and 72".

The wheel head incorporates the recently announced Filmatic spindle bearings, which are of multiple shoe construction, steel backed and bronze lined, self adjusting for load variations resulting from light or heavy cuts. Completely submerged in oil, the spindle is rigidly and accurately supported by wedge shaped oil films. A safety switch in the electrical circuit precludes operating machine with an inadequate supply of oil. The grinding wheel and driving sheave are mounted on opposite ends of spindle and close to bearings, thus reducing bending moment from load applied to these two points to a fraction entailed in conventional design. The spindle is driven by a 3 H.P. motor mounted on top of wheel head unit. Wheel mounts are of balancing type, with gibbed construction definitely holding wheel head down against forces of grinding.

Table feed is hydraulically actuated from a circuit which supplies pressure on both sides of piston, with feed rates infinitely variable from 3" to 240" per minute. Table tarry, at each end of stroke, may be varied from 0 to 5 seconds, with accuracy of reversal at any table speed held within .004". The stroke of the power table traverse with automatic reversal may be set as short as $\frac{1}{32}$, the short stroke producing an effect comparable to a grinding wheel spindle reciprocating attachment.

A new mechanical speed change device, built into the headstock, eliminates need for a variable speed D.C. motor. By merely rotating a small hand-wheel in front of the unit, an infinite range of speeds—55 to 500 RPM—is obtainable. The headstock may be swiveled at right angles to the grinding wheel for face grinding and also incorporates the necessary mechanism for quickly changing from live to dead spindle operation and vice versa. Of particular interest, with regard to low maintenance costs, is that unit construction is employed throughout, so that any unit can be dismantled without affecting others. The hydraulic mechanism is readily accessible and the valve block is removable without disconnecting a single oil line.

The machine, as will be seen from illustration, is clean cut in design and of unusually rugged construction. Complete description is to be had in a descriptive bulletin, obtainable by writing the makers.

Above is shown the new Rickert-Shafer horizontal threading and tapping machine, recently introduced. It is particularly adaptable wherever a variety of "second operation" threading and tapping jobs are handled—up to $\frac{3}{4}$ ".

Below is shown the new Cincinnati Hydraulic Universal Grinding Machine, model ER, recently announced by Cincinnati Grinders, Inc. Tradition has been discarded, say the makers, in order that a machine could be produced, based on a study of customer requirements and so that the average operator can do craftsmen's precision grinding in production time.



A new Horizontal Hand Threading and Tapping Machine of compact design is announced by Rickert-Shafer Company of Erie, Pa., for use wherever a variety of "second operation" threading and tapping jobs are handled up to $\frac{3}{4}$ ". The popular R & S Model C Self-opening Die Head mounted on the ball bearing spindle is automatically closed on the backward movement of the operating lever. The R & S Model "C" Collapsible Tap can be easily applied for tapping, resetting, is accomplished with the same backward movement of the operating lever.

Suitable work holders to meet a great variety of production threading are available for work of irregular shapes as well as Collet-type holders for round stock.

This new production threader is motor driven with 3 speed V-Belt and has oil pump and reservoir, offers an economical threading and tapping service at low cost.

Knu-Vise, Inc., 2895 W. Grand Boulevard, Detroit, Mich., is out with an improved toggle clamp, the KV series. The most important change is in the toggle bar, made in two halves and spot welded in position in assembly. The compression links pivot on the inside of the toggle bar, which in turn rotates on the outside of the cast steel base. This construction has been found superior to previous designs, because the casting provides greater wearing surface.

All components are hardened and cadmium plated, except for base which is black enameled. There are four clamps in the series, all of which have fixed bases of Tee section with ample clamping flange. The No. 110, shown in photograph, lists at \$4.00, is subject to discount.

▼ ▼ ▼

An innovation with interesting possibilities has been developed by the Kato Engineering Co., Mankato, Minn. It is a DC motor which, in addition to furnishing driving power to equipment from DC current, generates AC current for use with special purpose tools. As, for example, the Doall Contour Shaping Machine (Continental Machines, Minneapolis, Minn.) is provided with a welding attachment for joining broken saw ends, or for joining bands that must be cut to permit threading through an internal sawing job. With local D.C. current, the Kato DC-AC motor takes care of all functions. The Kato motor has various other uses, as low voltage current for operating relays and controls, time cycle equipment and operation of fluorescent type lamps. We pass the information along to those interested.

▼ ▼ ▼

Hannifin Mfg. Co., 621 So. Kolmar Ave., Chicago, presents a new 50-ton capacity Plastic Molding Press which, through special mechanical features and low cost, offers a decided advance toward better molding and greater

economy. The manufacturer states that many of these presses are already in use by large electrical manufacturers for molding bakelite.

As seen in the illustration, the press is compact and unusually simple. It is air operated and develops fifty tons at 80 pounds air pressure, can be stepped up to seventy tons with higher air pressure. Overall height is 7 ft. approx., floor to lower platen, when open, is 46 inches. Press occupies less than 5 sq. ft. of floor space.

Distance between columns is 22 inches, clearance between platen and top strain head 17½". To accommodate various sizes of dies, however, the strain head is adjustable for 12", permitting a maximum clearance of 29½". The platen stroke is 8", with provision made for installation of ejector pins or separate ejector cylinder.

A unique power stroke makes the press particularly suited for compression molding of thermosetting plastics. Pressure is developed through a combination lever and toggle mechanism developed especially for this kind of work. Platen advances rapidly but decelerates when dies begin to close, allowing time for the compound to soften. The result is smoother and denser products. The rate of up-travel and return speed are both adjustable to suit the application. An important feature is that full tonnage is available to break the mold when reversing cylinder.

Where air is not available, the press can be furnished with a completely self contained hydraulic power unit at small additional cost. With it, a variable delivery oil pump is used to maintain pressure during the cure; this required but a 2 H.P. motor. Hannifin Mfg. Co. also offers a similar press in 15-ton capacity as well as complete hydraulic

presses for compression molding in excess of 300 tons capacity.

▼ ▼ ▼

Stanley Tools, New Britain, Conn., has added to its line of Electric Soldering Irons. Known as the Plug Tip, the new iron differs from previous models in that the tip fits into the heating head of the iron and is held by a screw. This permits easier removal and adjustment of tip than where tip is screwed in.

Heating unit is hermetically sealed to prevent corrosion, is wound around a hollow core and conducts a uniform flow of heat to the tip. Handles are of hardwood, with adjusting sleeves which permits increase of handle length. Each iron is furnished with 6 ft. approved cord, cord strain relief and tool rest stand.

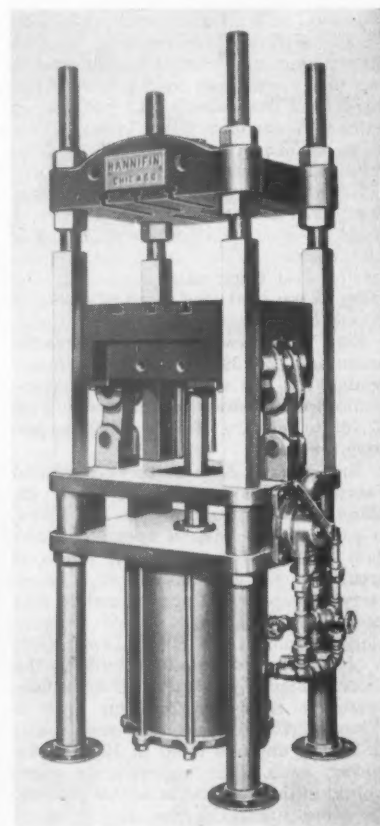
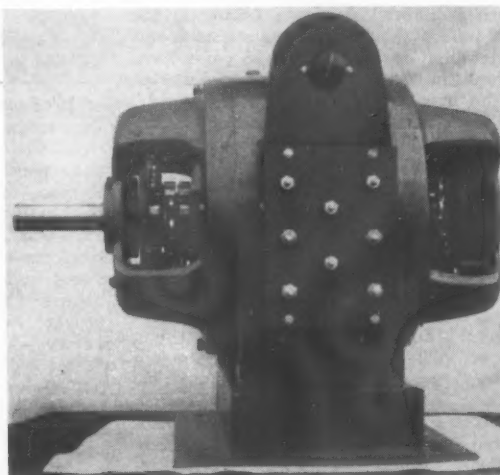
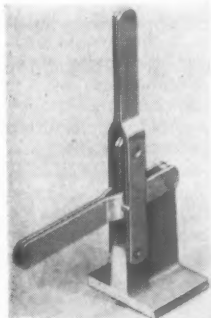
Plug tips are available in two types, Copper and Armor clad. Both are similar except that latter is clad with a special metal coating that protects surface of copper and produces a long life tip free from corrosion and rapid wear. Stanley Plug Tip Electric Soldering Irons are made in four sizes; 105 watt, ¾ tip dia., 150 w., ½ tip, 200 w., ¾ tip and 350 w., ¾ tip dia.

▼ ▼ ▼

A new Electric Solderer, especially recommended for all kinds of light soldering, is announced by Ideal Commu-

(Continued on Page 50)

Below is shown the Knu-Vise toggle clamp. This is a new improved type known as the KV series. Important change in this series is the improved toggle bar, made in two halves and spot welded in position in assembly.



Production Perspectives

News of Mass Manufacturing from Everywhere

INDUSTRIAL activity in the first quarter this year will be higher than a year ago the National City Bank of New York said February 2. The slackening in new buying the last few weeks, the bank said, may be ascribed both to satisfied requirements as a result of "the almost unprecedented concentration of buying within two or three months last fall" and to a clearer and better considered view of the early 1940 prospect. "Buyers cannot indefinitely stay out of the markets," said the bank. "As the season advances new requirements will have to be filled and there is considerable evidence of intention to keep well covered while the war lasts. Sentiment has been prepared, however, for curtailment in industrial operations." The bank further asserted that to a great extent the dangers of excessive commodity and security speculation, excessive debt making and increases in industrial costs and prices, have been kept out of the business improvement—a strengthening factor. Present evidence is, the bank continued, that inventories are not excessive in relation to consumption and will not reach "threatening" proportions unless consumption falls off considerably.

The National Machine Tool Builders Association has announced its operating index remained unchanged in January from December's 93.3 per cent of estimated capacity. The index, which stood at 52.5 in January, 1939, climbed every month last year.

Sales of new passenger cars in January, 1940, increased 33 per cent over those in January, 1939, the Automobile Manufacturers Association reported recently, and truck sales for last month were 25 per cent over those of the same month last year.

New passenger car deliveries amounted to 239,506 units in January against 180,692 units the year before; while truck deliveries increased from 37,186 in January 1939 to 46,293 in January, 1940.

The Army Air Corps announced February 12 its new bombardment airplane, technically known as the XB-24, is expected to have a speed of more than 300 miles per hour, a range of approximately 3000 miles and a bomb carrying capacity of approximately four tons. The new plane, which recently made its initial flight at San Diego, Cal., is of all-metal construction, built by the Consolidated Aircraft Corporation. Power is furnished by four Pratt & Whitney 18-cylinder twin row radial air-cooled engines rated at 1200 horsepower each. The approximate gross weight of the airplane is 40,000 pounds, the wing span, 110 feet, and over all

height, 19 feet. It will carry a crew of from six to nine men.

The extremely sharp upturn in railroad traffic in 1939, especially in the final months of the year, was shown February 13 in the December and full 1939 report of the New York Central railroad, one of the most sensitive barometers of rail traffic in the country. For December, the system reported net income after fixed charges was \$4,126,402, equal to 64 cents a common share. This compared with net income of only \$259,083 in the comparable 1938 month. In the 12 months ended December 31 net income after fixed charges amounted to \$4,509,236, equal to 70 cents a share. Although this was but \$382,834 greater than for the single final month, it compared with a deficit after fixed charges of \$20,154,357 in the year 1938.

Price-cutting among electric refrigerator manufacturers was intensified February 2. General Electric Co., one of the "big four" manufacturers, on February 2 announced reductions bringing its prices about in line with Nash-Kelvinator, Westinghouse and Frigidaire, other members of the "big four." G. E.'s new six cubic foot models will start at \$114.75. Last year this model sold at \$142.90. Crosley Corp. announced six-foot models will be priced as low as \$99.95.

If the past is a guide to coming events, America's future offers miracles of invention as sweeping as those responsible for thousands of modern products and millions of present jobs. In proof of the point, facts, figures, personalities and products were paraded before leading business men of northern Ohio and western Pennsylvania in Hotel Staller, Cleveland, the night of February 7. The event was the "Modern Pioneers" dinner, a tribute to the 32 men of this area whose research and invention during the past 25 years have done the most toward making America "the most envied nation in the world." It was also a commemoration of the 150th anniversary of the founding of the American patent system. To Walter D. Fuller, president of the Curtis Publishing Co. and vice president of the sponsoring National Association of Manufacturers, was entrusted the phrasing of the business man's viewpoint toward the future role of invention and research. He held that the role should be much the same as it has been in the past, but that "alphabetical ways" to prosperity endanger the American "incentive system." To Thomas Edison's patents alone Mr. Fuller attributed investments today of "perhaps 10,000 million dollars, direct employ-

ment of probably 1,000,000 persons and the living of "perhaps 10,000,000 people, men, women and children." "Could you have a more perfect illustration of how inventions produce jobs?" he asked. "Strangely enough," he continued, "the reactionary has frequently posed as a progressive. We hear of suggested restrictions upon invention and upon our hope for progress to happier days." Thirty of the 32 designated "modern pioneers" of this district were present to hear Mr. Fuller's address. They ranged from the men responsible for intricate chemical or electrical developments to Dr. Gideon Sundbach, whose introduction as the inventor of the zipper fastener brought thundering waves of applause. Many of the honored guests were laboratory scientists comparatively unknown to the public. Embarrassed at the acclaim they received but equally filled with pride, they rose one by one to receive honor certificates and to be introduced by W. T. Holliday, president of the Standard Oil Co. of Ohio and chairman of the celebration. Joining with the National Association of Manufacturers in sponsorship of the dinner were the Associated Industries of Cleveland and the Ohio Manufacturers' Association. The National Association will sponsor a dinner for the 19 National Modern Pioneers in New York Feb. 27.

Milwaukee county, Wisconsin, in 1937 ranked fourteenth in the country in the value of manufactures produced with a total of \$681,369,471 and fourteenth in the money spent for manufacturing necessities, which amounted to \$370,851,364, Harry L. Hopkins, secretary of commerce, asserted February 13 in reports analyzing economic trends. The value of products manufactured in Milwaukee county in 1937, the latest year for which complete government figures are available, rose from \$324,023,084 in 1933, or a gain in the period of 110.3 per cent. The county's value of products manufactured in the post-depression boom year of 1937, however, was not as great as in 1929 when their worth was placed at \$912,256,148 to place the county in the twelfth position in the country. The decline from 1929 was 25.3 per cent, according to the Hopkins figures. The amount of money spent in the county for manufacturing necessities, such as materials, fuel and power, in 1933 was \$156,288,970 as compared with \$478,304,828 in 1929 and \$370,851,364 in 1937. The Hopkins report shows 25 per cent of the total value of manufactures in the United States was concentrated in eight counties in

(Continued on Page 24)

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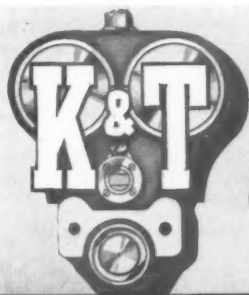


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Milwaukee **MILLING MACHINES**

A. S. T. E. DOINGS . . . *By Geo. J. Keller*

Fred J. Kempmeier, Co-Chairman of Rockford Chapter presided over a very interesting meeting at the Faust Hotel on February 1st. The dinner talk by Commander Essler, of the Ninth Naval District, was both timely and extremely interesting in that it focused attention on the magnificent display of models of sea craft shown by the Rockford Navy Club. The three reels of movies shown by W. K. Bailey of Warner & Swasey Co. taught them much about the manufacture and use of both Telescopes and Turret Lathes. The dinner was enlivened by the surprise singing of "Mack" McClellan. He sure could lead 'em. The dinner attendance was 250 and the lecture attendance was 450. Rockford's annual meeting for the election of officers was held at the Faust Hotel on February 8th. The following officers were elected: Chairman: Kenneth Lund, 1st Co-Chairman: Henry F. Ruehl, 2nd Co-Chairman: Fred Kempmeier, 3rd Co-Chairman: Leo Reuland, Secretary: Rudy Meili, Treasurer: Blakeman Ades. After the business meeting the members were entertained by sound movies with a smoker following.

Mr. John Coneen of the Aluminum Co. of America gave the Rochester Chapter an interesting talk at their February meeting. After the talk the annual election of officers was conducted and resulted in the following being elected. Chairman, John Dense; Vice-Chairman, Cecil Lucas; Secretary and Treasurer, Milton Roessell. Two new Board members were elected, namely Frank O'Brien and Fred Bittner.

The 3rd Annual Supper Dance of Buffalo Chapter was a big success. On February 2nd, 96 couples had a swell time that did not break up until 3 A.M. The God-father of the Chapter and the Treasurer with some others were discovered at a downtown restaurant about 6 A.M. Luckily the Secretary didn't know there was a profit of \$1.77 or he might have joined the group. For once Ott Winter went right back to the sand dunes of Grand Island after the music stopped. Fifty-five members and guests attended the dinner and about 25 more came for the lecture and election of officers on February 15th. J. F. Coneen, Aluminum Co., gave an illustrated talk on "machining aluminum" followed by a sound movie on the Aluminum industry. The election resulted in the following: Chairman, Geo. J. Keller; Vice-Chairman, Allen C. Seigel; Secretary, Alfred Cotesworth; Treasurer, Charles Starke. Some rather ambitious plans are under way for the meeting in New York. George Harris has left for a two months stay in Florida. Hope your health improves,

Dear Ford R.

It's been five weeks since your cheery voice offering aid was wafted over the wires into my little hospital room up where deer are dear and men are fools.

Five weeks during which Mama Nature has incessantly worked in her mysterious way to rebuild the misshapen object which was my perfectly good left foot before a hell-bent bullet shattered it in a wee split second.

Five weeks of almost babyish helplessness during which all I could do was think—and occasionally wish I couldn't.

I've been thinking a lot about misfortunes that so often bring with them gains which make one incline to the belief that the total experience may show upon the profit side of life's final balance sheet.

Don't know what I'm driving at? Well, here's what I mean in American. First of all, we in our household were once more reminded that the "Old Man" has a running-mate who measures up to every requirement as only a few women and an occasional angel can. You can't estimate the value of that knowledge in a home.

And here's something else for the profit side. I've had a host of visitors. I believe they came to visit with me because they really wanted to. They are my friends, more precious than which there is nothing else on earth—a fact most appreciated by a worldling just reaching the hump of life. Without the misfortune I could never have realized how many friends I have.

A lot of friends to warm the old heart and lend an added meaning to life. A goodly number—and I'm sure it'll encourage you to know that a high percentage of them are the result of my abbreviated activities in an Engineering Society—which one is too prone to picture as a coldly analytical group of soulless scientists and greedy go-getters.

Flowers, tokens of friendship, offers to help a wounded one over the rough spot—these are the surprising "little things" which came to me to crown a misfortune, came to me from the American Society of Tool Engineers—the Society with a soul.

I believe you have had a great part in planting and nurturing this spirit in the Society. May its flame continue to grow until every member feels its warmth.

Thanks for everything.

O. B. Jones.

Box 543

Farmington, Michigan.

Mr. O. B. Jones, President of Detroit College of Applied Science and originator of the idea of forming the American Society of Tool Engineers and one of the original organizers of the Society had a serious accident during November 1939 while hunting for deer in Northern Michigan. Through a very peculiar accident, which was just one of those things, his gun discharged and shattered a hole through his left ankle. The above letter received by Ford R. Lamb, Executive Secretary, indicates the type of mind and the spirit which pervades the A.S.T.E. organization and which is of interest to all Tool Engineers.

George and we'll be looking for an early return.

Fifty members and guests of Elmira Chapter plowed through the heaviest

snowfall recorded for more than thirty years in this vicinity, to hear J. F. Coneen of the Aluminum Co. Five applications for membership were received and the following officers were elected: Chairman, J. R. Blank; Vice-Chairman, C. D. Thomas; Secretary, E. J. Carlton; Treasurer, H. J. King.

The Twin-City Chapter's February meeting was a big success. Sixty-five guests and members attended the dinner meeting and around 250 were present at the lecture to hear Mr. E. V. Crane of the Bliss Company. Geo. W. Wise broke the third term precedent and politicianed himself back into the job of Chairman. Glenn Roberts was elected Vice-Chairman, Herman Seaberg was elected Secretary and it was determined that Carl Bekule was the only man in the gang that could be trusted with the money and was, therefore, re-elected Treasurer.

Cleveland Chapter had a turnout of 225 members and guests at their February meeting. Following a nice dinner was the annual election of officers and C. V. Briner was elected Chairman, with Bill Reiff as Secretary and Walt Wyatt as Treasurer. "Super-finish" as the subject of the Technical session with A. M. Swigert of the Chrysler Corp. as speaker. A very lively discussion period followed with Cleve Briner finally having to bang the gavel or the boys would have stayed all night.

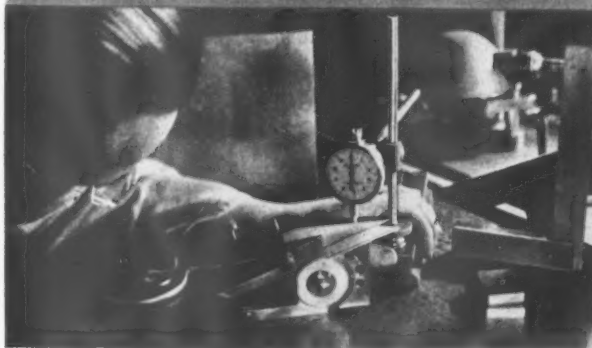
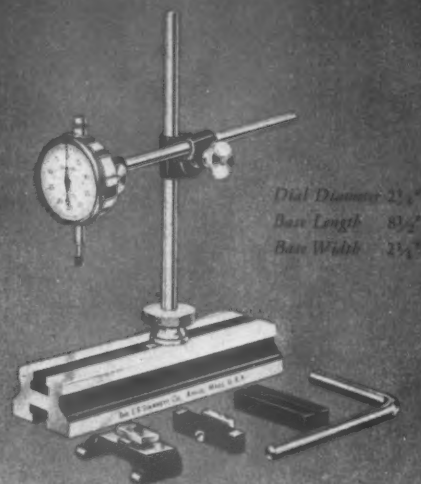
York Chapter had a grand meeting in February. Forty-six members enjoyed the turkey dinner and 75 members and friends heard Frank Hoagland, Master Mechanic of Pratt & Whitney, Hartford, Conn. talk on "Jig Bore and Some of the Problems Connected Therewith," which was illustrated with lantern slides. Mr. Hoagland was not only a capable speaker but also a humorous one as the boys really lost their serious expressions. York will elect new officers in March.

Over 375 members and guests attended the annual stag party of the Milwaukee Chapter January 26th at the Hotel Schroeder. It was the most successful stag party ever held and much thanks goes to Bill Nichols who headed the entertainment committee. At the February 8th meeting Geo. Sandborn of the Fellows Gear Shaper Co. spoke on "New Developments in Involute Gearing." Milwaukee's next monthly meeting will be held in conjunction with the Wisconsin Engineering Conference at the Pfister Hotel, March 13th and 14th. Don't forget fellows—a dance will top the evening of the 14th. Bring the ladies. Every member should attend both days as a good representation at these two meetings will do more

(Continued on Page 34)

HOW MANY WAYS
CAN YOU USE
STARRETT
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No. 665?

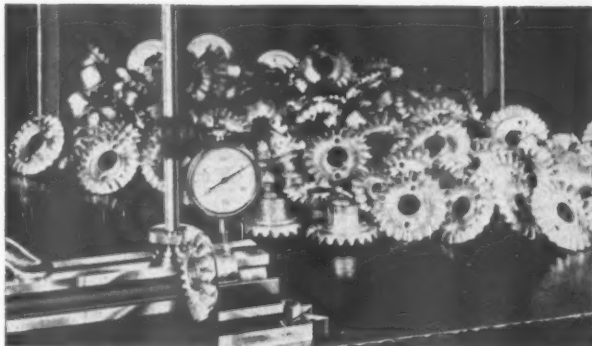
[For suggestions and complete description, see
Starrett Dial Indicator Catalog T (Second Edition)]



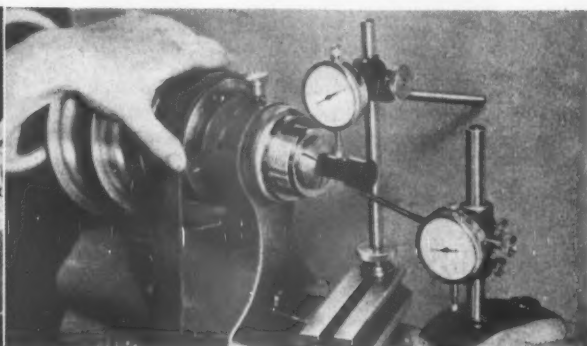
IN THE TOOLROOM — shown checking a small angle parallel.



IN THE SHOP — shown inspecting a broach after sharpening.



ON THE INSPECTION BENCH — checking hubs of bevel gears.



IN THE LABORATORY — testing socket screw for head to body concentricity — photo courtesy of Parker-Kalon.

THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers — Manufacturers of Hacksaws Unexcelled — Steel Tapes, Standard for Accuracy — Dial Indicators for Every Requirement

Standardize on
STARRETT TOOLS
BUY THROUGH YOUR DISTRIBUTOR

PRODUCTION PERSPECTIVES

(Continued from Page 20)

1937. They were, in order of their ranking, Cook county, Ill. (Chicago); Wayne county, Mich., (Detroit); New York county, N.Y.; Philadelphia county, Pa.; Los Angeles county, Calif.; Alleghany county, Pa., (Pittsburgh); Cuyahoga county, Ohio, (Cleveland), and Erie county, N.Y. (Buffalo). Following these counties in the value of products manufactured and topping Milwaukee were Kings county, N.Y.; Lake county, Ind.; St. Louis county, Mo.; Hudson county, N.J., and Baltimore city, Md. Of Wisconsin counties, Racine, Rock, Kenosha, Brown and Sheboygan also classified in the list of the 167 counties in the coun-

try with the highest valuation of manufactured products.

Business activity during January declined somewhat from the high levels attained in December but was "well ahead" of the figure set in January, 1938, the Commerce Department reported at Washington Feb. 8. The department's monthly business review showed that activity was relatively high in plants producing "advanced manufactures" where substantial, unfilled order totals were carried over from last year. A decrease in "primary manufactures," attributed to a higher rate of production than called for by new business, forced the general level downward, however. The department cited

a decline in the prices of basic industrial raw materials as "an outward manifestation of the more cautious purchasing policies that have prevailed lately." A drop in steel orders, which constitute a heavily weighted factor on the monthly index, featured the decline, the report said. During the fourth quarter of 1939, the industry in an attempt to work off the accumulation of orders, reached a peak of 94 per cent of capacity but the rate dropped off to about 72 per cent by the end of January. In contrast, the machine tool and aircraft industries continued strong throughout the month. This was attributable partly to plant expansion for war orders and national defense purchases. The Federal Reserve Board's monthly bulletin revealed that the board's seasonally adjusted index of industrial production dropped from 128 for December to 120 for January. Explaining that its index is adjusted to meet ordinary seasonal changes, the board said the drop probably was explained by the fact that many important industries "were increasing operations as rapidly as possible in the latter part of the year, with some approaching capacity production." This, it said, was reflected in the high December index figure. The board said that 1,000,000 fewer persons were working now than in 1929 but that they were producing more goods due to technical improvements. Non-agricultural employment at the end of 1939, the board said, was about 35,000,000 persons which is 8,000,000 more than in 1932 but 1,000,000 less than in 1929.

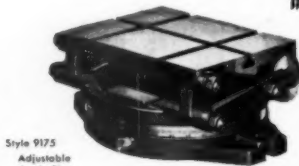
That America is too big and too young and too full of resources to be licked was the optimistic view expressed on every hand the night of February 8 as more than 1,400 of the country's top-flight business executives sat down to the Cleveland Traffic Club's biggest of all annual dinners in Hotel Cleveland. The guest list included a dozen or so railroad presidents, a score of chairmen of railroad boards and presidents and vice presidents of industrial concerns in the multi-million business class; and all who expressed opinions in interviews or from the platform saw green lights ahead for the country. Patriotism was the program motif. Speakers dwelt on the theme that the time for glooming and grumbling was over and the time was here for pulling together. Railroad presidents agreed without exception that business was better this January than last and that prospects for at least the first part of the year were bright. Most of them expressed no worry over "political uncertainty" in this campaign year. "Who started all this gloom about the depression?" asked Frederick C. Crawford, president of Thompson Products, Inc. and of the Cleveland Chamber of Commerce. Crawford, a Republican, was invited to speak, R. J. Hanson, Traffic Club president, explained, to sort of offset Congressman Luther Patrick, Alabama Democrat. "America is

FOR CLOSER MEASUREMENT of Angles and Tapers

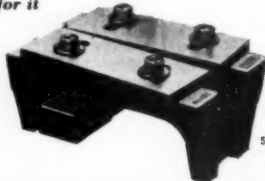
... use this Taft-Peirce Equipment

FOR MORE ACCURATE set-up and inspection of angular work, the principle of the sine bar has been successfully applied to many Taft-Peirce Toolroom Specialties. These include the Sine Bar, Sine Block, and Sine Bar Fixture, the Toolmaker's Adjustable Knee, and the Sine Block Taper Testing Fixture. Desired angles can be produced also with the Universal Angle Gage and the Combination Angle Block Set. The complete line of Angle-measuring Equipment is described in the Taft-Peirce Handbook.

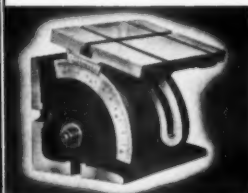
Write for it



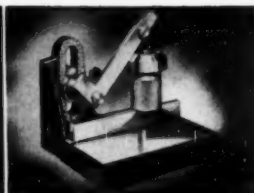
Style 9175
Adjustable
Angle Plate



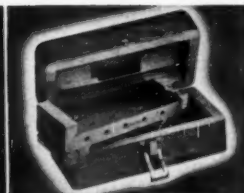
Style 9100
Taper Test
Gauge



● Style 9170 — Toolmaker's Adjustable Knee



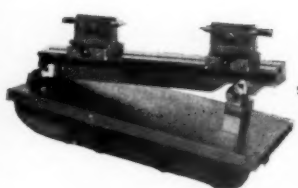
● Style 9120 — 5" Sine Bar Fixture



● Style 9118 — Sine Block



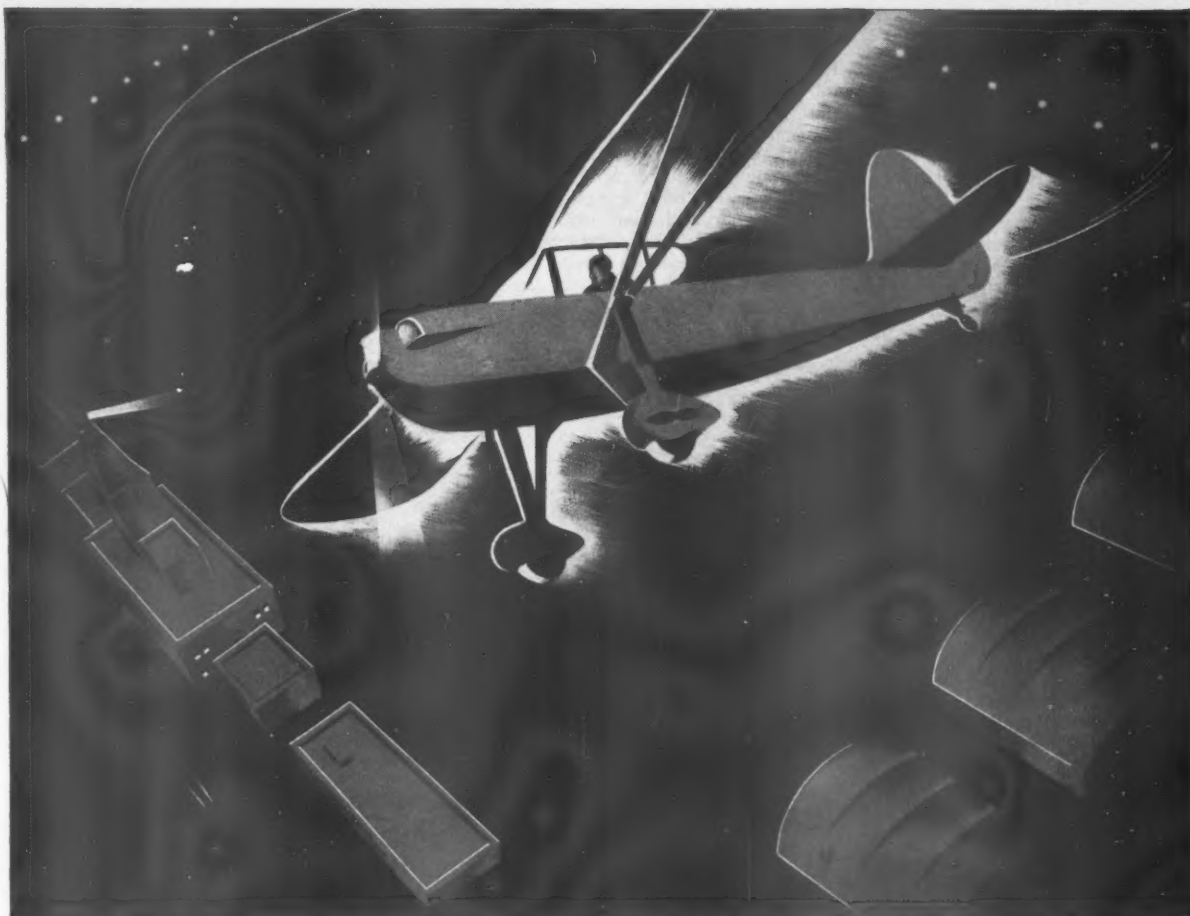
Style 9125
Universal
Angle
Gages



Style 9122
Sine Block
Taper Testing
Fixture

The Taft-Peirce Mfg. Co., Woonsocket, R. I., U. S. A.

(Continued on Page 26)



WHERE DEPENDABILITY COMES FIRST

The prime consideration to both manufacturer and user of a light plane engine, is dependability. And among the vital factors in insuring dependable performance are the materials specified.

That is why a prominent manufacturer of light plane motors uses Chrome-Molybdenum (SAE 4140) steel for crankshafts and certain accessory gears and shafts.

Experience proves that, when properly heat treated, the steel develops the requisite combination of duc-

tility, impact strength and fatigue strength with hardness. Out of this combination of mechanical properties comes the essential dependability. In addition, the steel machines well at the specified hardnesses.

Detailed information on Chrome-Molybdenum (SAE 4140) and other Molybdenum steels important in industry will be found in our technical book "Molybdenum in Steel". This book, giving details on modern materials for modern needs, is free on request to interested executives and production heads.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

PRODUCTION PERSPECTIVES

(Continued from page 24)

young," Crawford continued in an "isn't it great to be an American" vein. "We're just beginning in transportation. Twenty-four hours to Europe—think of that. This is the same old country of opportunity." He quoted from "the country is being ruined" editorials of 40, 70 and 100 years ago, and pointed out that courage, hope and faith had prevailed and would again. **Congressman Patrick** raised gales of laughter with his homespun southern humor, but at the same time **got over a defense of New Deal reforms**, which he holds have renewed the faith of poor men in government.

Five hundred new lightweight, repainted "glamour girls" of the rails are rolling over the country. This follows delivery by the Pullman-Standard Car Manufacturing Co. of that many box cars to the Nickel Plate, Wheeling & Lake Erie and Pere Marquette railroads. Although departures in general appearance are slight, the new cars are glamorous from the railroad man's viewpoint because of the **extensive use of high-tensile, low-alloy steel in their construction**. This is the same metal used in building many streamlined passenger trains. The special construction, it is believed, **will mean appreciable savings in railroad operating costs**. Each new car weighs about 9000 pounds less than

the old-type carrier and this 4½-ton saving of "dead" weight can be converted to "pay load" without increasing the cost of building.

Ultra-stylized motor car bodies of colored plastics, which eliminate all need for painting and which neither fade nor chip, are envisioned for the not-so-far-distant future by George W. Walker, industrial designer. In his studios, where he developed the curves and contours of the 1939 and 1940 Nash cars, Walker already has rendered into finished plans and drawings automobiles made of new synthetic substances—motor cars with, for instance, curved airplane-type wind shields and curved rear vision windows of transparent plastics, taking the place of what he terms "uninteresting panes of glass." **Walker admits that for a long time he has had a strong desire to do something about the glass in automobiles, to replace it, if possible, with a crystal-clear, transparent substance that has strength and that can be curved to "flow-in" with the body lines of the car. Now, he says, such synthetic "glass" has been developed.** As clear as real glass, it will do what few forms of special glass can do—**admit the ultra-violet rays of sunlight.** More important, in his estimation, it can be molded into the most subtle curves and it possesses the safety factor of being almost unbreakable. "Already, it is being worn in goggles by workmen whose eyes would otherwise be endangered by flying sparks and pieces of metal," Walker points out. "Even spectacles are being made of it, their lenses ground to prescription like those of ordinary eyeglasses." Coming fast, Walker believes, is the day when the automobile body proper and the fenders will be of plastic materials, with the manufacturer able to offer the public an almost limitless range of colors. "Because the color is an inherent part of the plastic there will be no need for painting the new-type automobile body and no danger of fading or chipping. This should tend to lower the manufacturing cost of the car. Walker declares his glimpse into the future, in which he sees bodies of plastics and plastic "glass" for automobiles, isn't pure fantasy. It's justified, he believes, by certain indications and by actualities. He quotes from a recent paper on plastics, read before a scientific body by Dr. **Gordon M. Kline** of the United States Bureau of Standards, who declared: "Plastic fenders and a molded body still remain as the greatest prospective field for extension of plastics in automobiles."

Charles T. Ray, President of B. F. Avery and Company, Louisville, Ky., said the concern had contracted to supply the Ford Motor Company with farming implements and special equipment for all Ford Tractors.

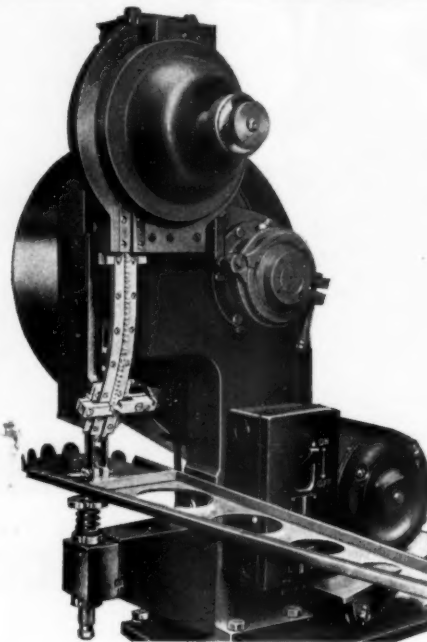
MIDDLE WEST

A \$4,000,000 program which will expand the huge plant of the Industrial

(Continued on page 32)

1500 RIGID JOINTS per hour

- a completely filled hole
- no flashing
- a neat, balanced head



This is a standard "Bench Type" Rivitor tooled for setting ⅜" dia. ¼" lg. duralumin rivets in aircraft wing sections.

The **RIVITOR'S** controlled setting action accounts for this superior type of joint. The setting tool rapidly approaches the work, slacks up a little as it nears the work and then with a comparatively slow speed applies the pressure for setting the rivet, giving the metal time to flow. What goes on is actually a "coining" process.

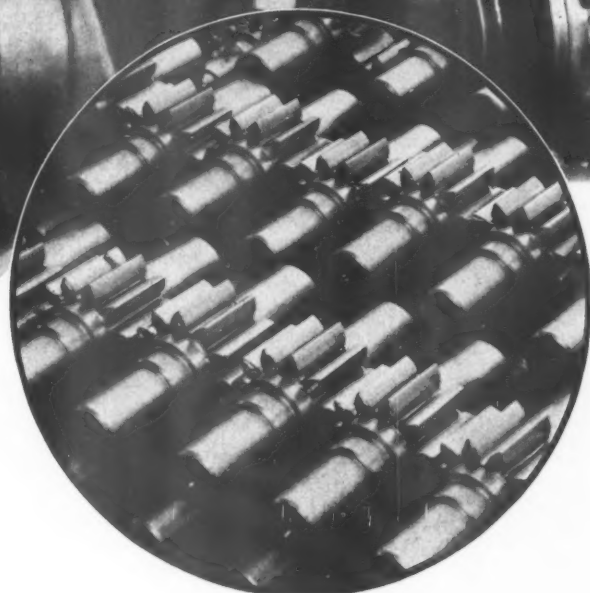
You can see for yourself the superior characteristics of the rigid joint produced. Send along samples of your work to be "set" by the Rivitor method. No obligation. Send two or three samples, a handful of rivets and specify the type of riveted head required or send also a sample already riveted. The pieces will be "Rivitored" promptly and returned for your inspection.

this is a **TOMKINS-JOHNSON** *product*

Send samples to The Tomkins-Johnson Co., 624 N. Mechanic Street, Jackson, Michigan

Agents in principal cities.

*Holds
High Accuracy
on Heavy Work*



B-C Type D Hobbing Machine

If it's high accuracy, fine finish, and long tool life you are looking for, then look to the Barber-Colman Type D Hobbing Machine. These 4120 steel bull pinions are finish hobbed at the rate of 18 per hour using Barber-Colman ground hobs. More than 360 pieces are obtained per hob sharpening. Performance like this is the result of a combination of these exclusive hydraulic and mechanical features found only in Barber-Colman Hobbing Machines.

- ★ Hardened and ground steel V way assures accurate alignment of the hob slide—preserves original accuracy over a long life.
- ★ Massive swivel slide with long bearings on bed.
- ★ Accurate indexing is assured by large diameter precision worm gear meshing with a precision worm in an unusually rigid mounting.
- ★ Work slide and overarm are one piece construction. Whole unit is hydraulically clamped at 5 points assuring extreme rigidity.
- ★ Plus — easy setup — automatic operating cycle and many other important machine features.

A Barber-Colman engineer will be glad to tell you more about this machine. Your request for an interview does not obligate you.

The Data

Name of Part.....	Bull Pinion	Time.....	3.4 minutes each floor to floor (2.9 actual cutting time)
Outside dia.....	3.333"—3.328"	Pieces per Grind.....	360
Face width.....	1.75"	Number of Settings.....	3 to 4
Material.....	Steel, 4120	Pieces per Setting.....	120
Operation.....	Finish Hobbing	Cutting Fluid.....	Oil
Number of Teeth.....	12	Accuracy.....	Kick-out less than .001", Pitch diameter runout .0015"
Pitch.....	4.5	Machines.....	Two Barber-Colman Type D Hobbing Machines
Pressure Angle.....	20°	Hob.....	Barber-Colman, Ground
Feed per rev. of work.....	.145"		
Hob Speed.....	120 r.p.m.		



This Bulletin illustrates and describes Barber-Colman Type D Hobbing Machines. Your copy will be sent upon request.



PRODUCTS
HOB, HOBGING
MACHINE, HOB
SHARPENING MA-
CHINE, REAMER,
REAMER SHARP-
ENING MACHINE,
MILLING CUTTER,
SPECIAL TOOLS

Barber-Colman Company

General Offices and Plant 913 Loomis St. Rockford, Illinois, U.S.A.

Handy Andy Says



ON the whole, I'm quite modern—ultra-modern in some things. As my views on social and engineering trends, for example. But, having fussed with automobiles since a kid of fourteen (when I first proudly "tooled" a sidewinder Olds through traffic (?) I'm still old fashioned about them in a practical way. I just don't trade every time

a new model comes along, although I like the modern streamlining and color schemes, the greater pep and all that. And I have a yen for their luxurious seats, but, doubtful of their whims and foibles, run my hand over the old reliable with a sense of comradeship. We've been over the road together. Lately, I've been shopping for a new one, have decided to take the one the wife likes. What the heck!—you can always get a new car.

But all that is incidental. What I started out to say was, how do the auto makers get that way? They've taken the crank away!—haven't even provided a hole. They tell me you don't need it any more (the crank, that is),

so, to remove temptation, they've taken the hole away too. They've stopped you both ends from the middle. Well—came a cold day, my starter whirled futilely as the Bendix hugged the shaft. Oh oh! But I just rammed the crank into the hole decently provided in the old reliable, gave her a twist and away we went, on the way to work helped push a few of the moderns to a start. Imagine yourself in a desert, with a new job gone haywire, a service station a hundred miles away (and where's the nearest phone?) and no practical way to get started! Gentlemen, we're getting too far from fundamentals; first thing you know they'll spring spontaneous generation on us.

Remember free wheeling? that came and went . . . the gearless differential? . . . friction drive? . . . sleeve and rotary valves? They may come back as new things to a new generation. We had coil spring suspension in '02, steering wheel gearshift in '10, independent springing with the cyclecar, automatic signals and hydraulic shock absorbers in '15. There just ain't nothing new under the sun. It's just the old stuff pepped up with these new variations. What I particularly object to is the modern bumpers, front and back. That's where the kangaroo shape the women affected back in '03 had its points; you could nest a whole row of femmes right forinst one another and there wouldn't be daylight between front bumper and natural or artificial bustle. But these modern bumpers are a snare and a delusion. They're both convex, so when somebody barges into you from the rear they either jack you up or climb over you. Make the front bumper convex, for easy shock on pedestrians and the rear concave, so both'll lock when pushing a guy who can't get started. And put back the choke! First thing you know they'll have radio control so the back seat driver does it all.

Now, don't get me wrong. I'm not knocking modern innovations, as you boys right well know. Rather, I'm a consistent advocate of modernization. I like cars that start with a touch of finger or toe, with bodies that you can run your hand along without getting scratched on hidden snags. I like insulated homes and automatic heat, zippers on your pants and all of the modern things that make for speed and convenience. And I wouldn't go back to the old except as a bride wants "something borrowed, something blue, something old and something new." But when it comes to automobiles, for gosh sake give us a crank and a hole to put it into!

Which reminds me that, back in '16 or thereabouts, I had one of those little puddle jumpers that was just reduced to essentials. Being of an experimental turn (I've never outgrown it) I had

(Continued on Page 30)

NEW SOUTH BEND 10-INCH LATHE



1" Collet Capacity
1 1/2" Spindle Hole
50 to 1400 R.P.M.
Spindle Speeds
Power Cross Feed
Power Long Feed
Screw Threads
4 to 224 Per Inch



Hand Lever Draw-in Collet Chuck



Hand Wheel Draw-in Collet Chuck

For Precision Tool Room Work and for Production Operations

THIS new 10-inch swing 1-inch collet capacity back-gear, screw cutting precision lathe has the time saving features of an engine lathe combined with the sensitivity and accuracy of a fine precision collet lathe. It is capable of the most exacting tool and instrument work, and has the power and rigidity for taking heavy cuts on high speed manufacturing operations.

Manufacturing attachments available include hand lever draw-in collet chuck, semi-automatic hand lever bed turret, double tool rest, automatic carriage stop, four-way tool post, hand lever tailstock, oil pan, oil pump and piping.

Tool Room attachments include hand wheel draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and collet rack.

SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906

476 E. Madison St., South Bend, Ind., U.S.A.



Mention "The Tool Engineer" to advertisers

Here is an *Easy* New way to cash in on Hidden Plant Capacity

CCHECK UP on your last week's idle machine time. Find out how much output you are losing just because of machines and presses that have to be stopped to redress, regrind or replace prematurely worn or broken tools and dies.

Most plants, by merely salvaging this lost output, could go a long way toward satisfying today's demands for extra production and lower unit costs. Furthermore, it is not hard to do.

For years, experienced tool makers in more than a thousand plants have been using Carpenter's Matched Set Method and Carpenter's Matched Tool Steels for this very purpose. With these two aids to better tools, they have been able to reduce shut-downs caused by inadequate tool performance to a minimum.

The method points out which tools are not up to snuff and indicates which matched tool steel will remedy the trouble. Then it provides you with exact heat treating data and the best hardening procedure to follow to get exactly what you want from that tool steel. Sounds easy enough, doesn't it?

It's just as easy to use as it sounds and a good deal more resultful. For the complete story, send today for your free copy of Carpenter's 60-page Matched Tool Steel Manual. There is no obligation and it will reveal a wealth of extra capacity hidden in your own plant. Use this coupon today.

THE CARPENTER STEEL COMPANY
READING, PA.

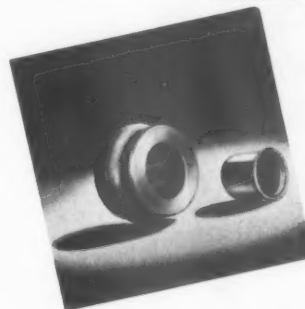
Carpenter
**MATCHED
TOOL STEELS**

**LICKS ABRASIVE JOBS AND GETS
EIGHT TIMES THE PRODUCTION**



The press was a 30 opening extrusion press for making tubular gunpowder. Extreme abrasion grooved the dies in five days, regardless of what make high chrome, high carbon steel was used—until they tried Carpenter's Hampden. Then they got an average of forty-two days per die. As an extra dividend, they saved the cost of redressing or remaking 1,590 dies per year.

**PRODUCES 86,000 PIECES PER DIE
INSTEAD OF 4,000**



The job was drawing a bearing retainer out of plain hot rolled steel, $\frac{1}{8}$ " thick. With previous steels, dies were replaced after 4,000 so they gave Carpenter's K-W a trial. At 8,000 pieces, they restoned in the press. At 42,000 pieces, they redressed the tool and then got an additional 44,000 pieces for a total of 86,000.

FREE 60 PAGES, ILLUSTRATED!

Complete explanation of Carpenter's Matched Set Method; new data on furnace atmosphere, drawing temperatures, torsional impact, toughness; full heat treating and working data on all nine Matched Tool Steels.



FREE to Tool Steel Users in the U.S.A.

The Carpenter Steel Company
122 Bern St., Reading, Pa.

Gentlemen:

Without obligation, send your free copy of the Matched Tool Steel Manual.

NAME TITLE

COMPANY
(Firm Name and Title Must Be Given)

ADDRESS

CITY STATE

HANDY ANDY SAYS—

(Continued from Page 28)

fussed with it until it stepped up from its advertised 40 m.p.h. to 60. But I just couldn't keep axles in it. The shafts ran on roller bearings, must have been made of soft steel because, after a bit, they looked like spools. Then, the load would be divided between the housing and the brake shoes. By the time the shafts got down to $\frac{3}{4}$ " diameter they'd snap off, which usually happened when I was showing how fast the crate would run. Fortunately, no one ever got hurt; it was just annoying.

About that time we had an order to make some shafts for the U. S. government, the specifications calling for Samson steel, made by Carpenter Steel Company. "Hal" thought I, seeing the way it machined, "there's the stuff for my axles." Had a couple made up, put 'em in. A year or so later, the body having rusted out, I dismantled the car, intending to use the engine out on my farm (ette). To my surprise, the axles were like new, with just a perceptible "feel" decrease at the journals. I gave the shafts to a friend, and his axle troubles were over. Now, noting Carpenter Steel Company's name among our pages, the incident comes back in all its freshness. What was good in

'17 must be better by now. One good turn deserves another, and I'm just passing a good thing along.

▼ ▼ ▼

As usual, one thing leads to another. I served my time in a magneto factory (we made the first high tension mags, I believe) and that was long before the days of modern cemented carbides. In those days the super-production cutting steel was the famous Mushet, which came in tool bit size. Which, naturally, meant that they went into Armstrong tool holders. Now, I notice that Armstrong Brothers have been an advertiser for years. Armstrong tools—oh sure! I've used about everything they've made,—have dangled on a shaft in the ceiling (in my roughneck days) and ratcheted a hole through with an Armstrong "old man" when nothing else would do the trick. Sturdy enough for the most exacting demands of '02—and before my time—they're stepped to the fastest modern pace. Like old friends, they wear well.

▼ ▼ ▼

Speaking of old friends naturally reminds me of O. B. Jones, President of the Detroit College of Applied Science and a pioneer in the science of Tool Engineering. Education is "O.B.'s" long suit, and I wonder if it has occurred to our readers that there is a wealth of education to be had in the literature which is reviewed by our editors and which is presented in each issue of THE TOOL ENGINEER. Some of this literature is sold at a nominal charge—and well worth it—but the most is free for the asking. Sure, it is sales stuff, some of it of ideas, most of it of product, but interestingly written and most of it highly educational. Speaking for myself, I have catalogues worth their weight in gold and as jealously guarded as an expensive hand book. The "new literature" is new!—it features the latest. Get in the habit of sending for it. It is compiled and distributed for your benefit.

▼ ▼ ▼

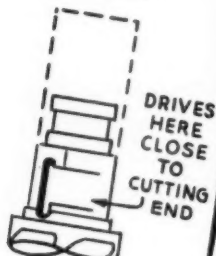
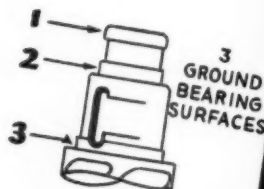
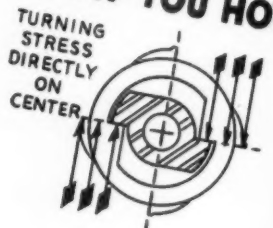
Well, by now the stage is set for the Annual in dear old Noo Yawrk. Haven't been there since the 42nd Street shuttle was knocked down. Things have changed plenty, but, if they haven't shifted the Met. Museum of Arts and the Museum of Natural History over to the Jersey flats I'm going to renew acquaintances with the mummies and dinosaurs, besides taking another peep at Venus emerging from her covering. But then, the censors do with paintings what the car builders do with automobiles; it just ain't there any more. Like the story about the guy who died and went where the preacher had told him he'd go if he wasn't good. Remind me of it and I'll tell you. It's too long to be written here. And the one about the hunters—Say! But that's a long one too. Well, here's happy landings.

Yours for Progress,

Handy Andy

RADIAL DRIVE WRITES A "STOP LOSS" ON YOUR INVESTMENTS IN TODAY'S TOOL MARKET . . .

THESE PICTURES SHOW YOU HOW



Introduced only four years ago — Today Radial drive is specified on over half of all Eclipse orders . . . You weigh the advantages listed below — Decide to try *Radial Drive* with your next Eclipse order!



BETTER ON THESE 6 COUNTS

- Hand detachable — cuts "change-time" to seconds
- "On center" drives give maximum strength, minimize vibration
- Location of drive nearer cutting edge lessens torque
- No trick locks nor tapers requiring pounding to remove
- Longer blade life
- Stronger pilot.

WRITE TODAY FOR ECLIPSE CATALOG 35

ECLIPSE COUNTERBORE COMPANY
DETROIT • MICHIGAN

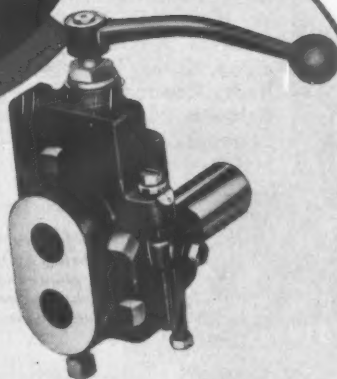
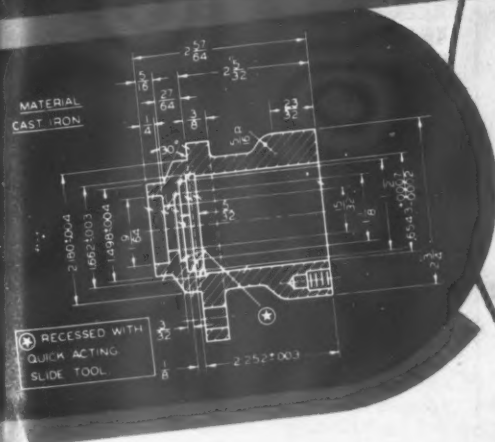
Would a 20% Time Saving Interest You?



Here are two of the many varied jobs turned out at the American Floor Surfacing Machine Co., Toledo, Ohio. The operations call for grooving, necking, recessing and facing on a wide variety of parts.

With the old style slide tool, much time was wasted in winding and unwinding the fine pitch screw of the tool. It was replaced by a new Warner & Swasey *Quick Acting Slide Tool*. Immediately an average saving of 18% to 20% in production time was effected. Furthermore, the rigidity and accuracy of the new tool enables flat faces and shoulders to be turned quickly.

The accompanying blue prints of these two typical parts show the details. If you do grooving, necking, recessing and facing, put a Warner & Swasey *Quick Acting Slide Tool* on your machine. *You* may save more than 20%. Why not find out today? Write



18% to 20% Time Saving on
These Jobs with the New
WARNER & SWASEY
Quick Acting
SLIDE TOOL

**WARNER
&
SWASEY**
Turret Lathes

Cleveland

PRODUCTION PERSPECTIVES

(Continued from page 26)

Rayon Corp. near Painesville, Ohio, by 50 per cent was announced Feb. 5 by Hiram S. Rivitz, president of the company. The expansion will add in excess of 6,000,000 pounds to the annual potential output of yarn for the weaving industry and will increase the output of the Industrial Rayon Corp. to 36,000,000 pounds a year. The expansion will be financed from treasury funds. "Our engineers are already at work preparing plans and we expect to break ground within six to eight weeks," Rivitz said. "The continuous spinning machines will be furnished by our wholly-owned subsidiary, Rayon Machinery Corp. We hope to be in opera-

tion by the spring of 1941." Rivitz outlined the expansion program in his annual report to stockholders, which shows the net profit for the year ended Dec. 31, 1939, was \$1,348,923, or \$1.71 a share. This compared with \$184,409 net in 1938, and was the largest since 1936, when profits totaled \$1,396,146. "We are entering 1940 under much more favorable conditions than prevailed in 1938 and the first half of 1939," the report states. "Inventories are low, demand continues to be good and prices are firm. Orders booked ahead are for 60 days only." The Industrial Rayon Corp. started operations in its \$11,500,000 plant near Painesville late in 1938. It is situated on a 508-acre tract on Lake Erie. Building was started

in May, 1937, and the first unit covers 14 acres. The plant in which spinning machines apply Industrial Rayon's process has been in continuous operation since December, 1938, producing at capacity since Aug. 1, 1939. A short time ago Industrial Rayon was reported employing about 4,000 in plants in Cleveland, Covington, Va., and Painesville, with 850 employed in the last named plant. A 50 per cent expansion will mean a substantial increase in employees.

Robert A. Peterson, who has taken up duties as superintendent of hot mills at the Cuyahoga Works, Cleveland, is returning to the American Steel & Wire Co., subsidiary of the United States Steel Corp., after a few years with the Gary Works, another Steel Corporation subsidiary. Peterson succeeds A. G. Montgomery who was appointed assistant chief engineer.

Willys-Overland Motors Inc., Toledo, has extended the standard Automobile Manufacturers' Association new car guarantee on 1940 Willys cars to 100,000 miles or three years. Joseph W. Frazer, president of the company, said this is the first time in automobile history for a passenger car maker to offer such an extended guarantee on his product. The 100,000 mile guarantee, he added, will apply to both Willys passenger and commercial cars. The usual guarantee, he said, is for 4000 miles and 90 days.

Representatives of four unions and the General Motors Corporation on the night of Feb. 13 signed an agreement at Detroit which paves the way for the calling of National Labor Relations Board elections in 59 corporation plants to determine collective bargaining agents for 125,000 workers. Signing of the agreement and filing the stipulation of terms with Horace A. Ruckel, NLRB trial examiner, cut short an NLRB hearing which otherwise would have been long in session at Detroit. The case now goes to Washington and if the Labor Board finds the hearing record acceptable it may direct the elections to be held early in the spring. The agreement was signed by A. F. Power, representing the General Motors Corporation; Maurice Sugar and Ernest Goodman, attorneys for the United Automobile Workers (CIO), and Henry Kaiser, attorney for the United Automobile Workers (CIO), the Pattern Workers League of North America (AFL) and the International Association of Machinists, affiliated with the National Die Sinkers (AFL).

A sharp increase in earnings "due to domestic business recovery plus foreign developments," was reported Feb. 12 by the Monarch Machine Tool Company, Ohio machine tool manufacturer. Wendell E. Whipp, president, listed net profits for 1939 of \$529,577, or \$3.25 a share, compared with \$321,398, or \$2.14 a share, in 1938. "Additions to plant and equipment made in 1939," Whipp told stockholders, "have increased your company's productive capacity to such

(Continued on page 48)

DoAll SAVED 22½ HOURS



Northwest Airlines, Inc. of St. Paul, Minn., made this special Wrench from chromally steel in 80 minutes on the DoAll, 40 minutes for sawing, 40 minutes for filing. Outside dimensions are 24" long, 18" wide. Former time was 24 hours burning, milling, shaping and sanding.

STARTLING RESULTS

Contour Sawing, the new DoAll process of machining, is recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.

Does work of 3 machines. DoAll is a moderately priced, rugged, precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

Used in large and small plants in 30 countries, by such firms as General Electric, Ford, Douglas Aircraft, Foster Machine, C. M. St. P. & P. R.R., Radio Condenser, Corey Steel, Baldwin Locomotive, Ferro Stamping, Underwood Elliott Fisher, etc.



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Let a factory trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

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Wings

FOR
PRODUCTION



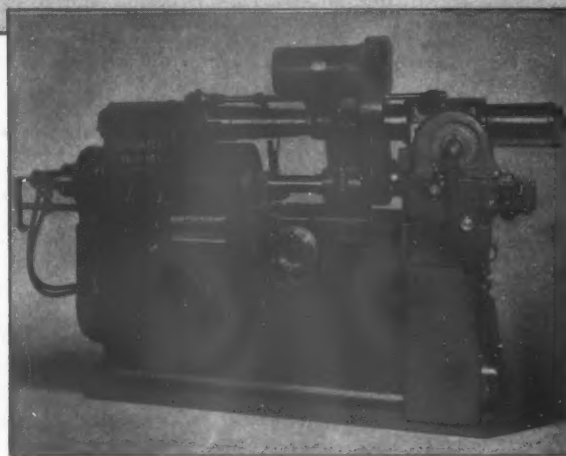
THE BRYANT 16-C-16 is being used by leading aircraft manufacturers throughout the world for speeding production and obtaining finer finish and greater accuracy on aircraft cylinder barrels. The Bryant principle of wheel suspension is a large contributing factor in producing cylinders rapidly, maintaining absolute roundness and straightness, and

a superior finish. The liquid cooled cylinder shown above, is produced in 20 minutes, floor to floor.

If you would like to add wings to your production of internally ground parts, write to Bryant — Bryant has an internal grinder for every production requirement.



BRYANT
CHUCKING GRINDER
COMPANY
Springfield, Vermont



A.S.T.E. DOINGS

(Continued from Page 22)

for advancing the interest of the society than many months of hard work.

Toledo Chapter continued to show its enthusiasm by luring an audience of over 200 men to its February Technical session and dinner at the Toledo Yacht Club. Tell Berna, General Manager of the Machine Tool Builders Assoc., gave a lecture on "The Machine Tool Builder and The World Outlook." Mr. Hugh Bennett of the Toledo Scale Co. proved to be an able toastmaster. Spicer Mfg. Company sent 75 men to the meeting. Let's hope other corporations show a like interest. The hall was so jammed it was necessary to crowd the speakers table for more room. A grand turnout and a grand meeting.

Hartford Chapter lost one of its mem-

bers and a good worker when Wilbur F. Chamberlain, president of Chamberlain-Simon, Inc., passed away on January 26th after an illness of three weeks.

Ontario Chapter had their monthly meeting on Friday, February 9th at the Oak Room of the Union Station, Toronto, at which time the present officers were re-elected as they had served for only a few months. Their speaker was G. H. Sandborn of Fellows Gear Shaper Co. Their next meeting will be held in Hamilton.

Dayton Chapter met at the National Cash Register Co. to elect new officers for the coming year. George Goodwin, Vice-Chairman for the past two years was unanimously elected Chairman. Walter Olt, Vice-Chairman; Howard McMillen, Secretary and Harry Winter, Treasurer. Plans were discussed for the annual meeting in New York in

March. The technical session was sponsored by the National Electrical Welding Machine Co. of Bay City, Mich. The meeting was concluded with a tour through the spot welding division of the National Cash Register Co.

Los Angeles Chapter's plans for the year got off to a flying start with its most successful meeting and dinner on January 25th. Mr. Malcolm F. Judkins of the Firth Sterling Steel Co. and Mr. Eugene Bouton of the J. I. Case Co. were speakers for the evening. Moving pictures were also shown. All chapter officers were re-elected for the current year. Symposiums on various phases of tool engineering are planned for future meetings and a March social gathering and dance for members and their families is in prospect.

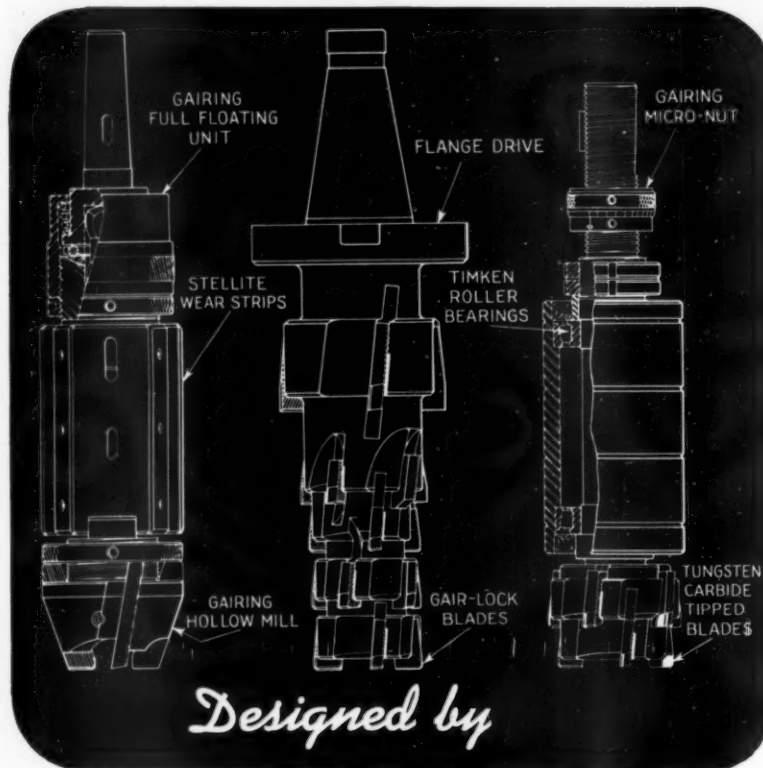
Mr. J. F. Coneen of the Aluminum Co. of America gave a very interesting lecture before **Syracuse** Chapter on February 13th at the dinner meeting at Syracuse Industrial Club. His subject was "Machining Aluminum and Aluminum Alloys." Ninety-four members and guests attended. New officers for the coming year are Chairman, Charles T. Allen; Vice-Chairman, F. C. Savage; Treasurer, John F. Dugan; Secretary, W. E. Parish. Syracuse held their second annual dinner dance on Friday evening February 16th at the Drumline Golf and Country Club. It was a big evening with cards and winter sports for those who did not care to dance. Somehow I can't imagine Ray Adams dancing or skiing. He must have played cards.

The **Baltimore** Chapter meeting was held February 12th with 25 members and friends attending the dinner and about 80 at the meeting. These boys still stick to home cooking. At the business meeting Mr. Nils Lou was elected Chairman an office which he held two years ago. Mr. W. R. Breeler of the Allegheny Ludlum Steel Corp., and a member of Buffalo Chapter spoke on the manufacture and developments of high speed Molybdenum Steel. His address was illustrated with slides and moving pictures.

Tri City chapter had a record turnout of 130 members and guests on February 7th. The following officers were elected: Chairman, J. B. Morganthall; Vice-Chairman, J. E. Gilchrist; Secretary, W. Z. Fidler; Treasurer, K. C. Jasper. By the way they added 28 new members during the past year. Fred Jackson, Kearney Trecker Milling Machine Co. was the speaker for the evening. The movie by U.S. Motors Inc. on electric motors was very interesting.

New York-New Jersey Chapter had a very interesting meeting on February 13th. Wally Gray elected Vice-Chairman in January to fill the vacancy left by Bill Brown, was elected Chairman for the coming year. Two Vice-Chairmen were elected: Frank Oliver and J. R. Ritzinger. Frank Delhagen was elected treasurer and Ben Brosheer continues as the hard working secretary. Chapter No. 14 is counting on winning

(Continued on Page 36)



GAIRING

Resourceful engineering talent, plus many mechanical features that are exclusively our own, frequently enable us to design and produce tools that cut time costs, attain closer tolerances with greater ease, reduce work spoilage. That's because each tool is made for individual application.

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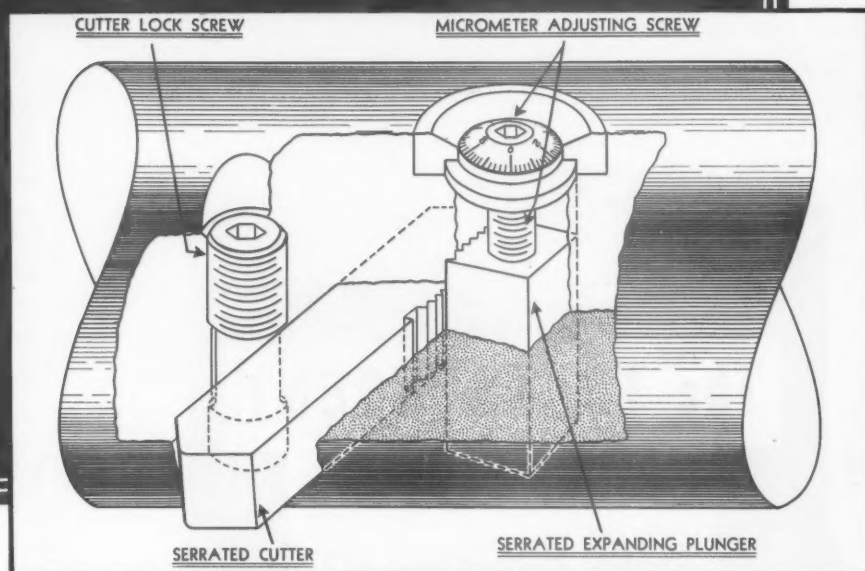
The Gairing Tool Co., Detroit, Michigan

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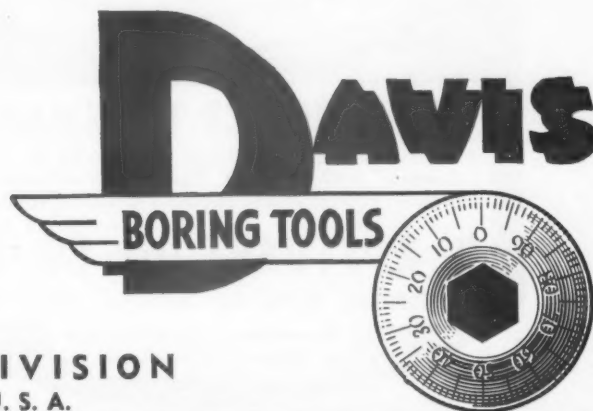
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4. **ECONOMICAL:** Universal in application, one tool covering a wide range of bores. Very effective with T. C. tipped cutters.
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DAVIS BORING TOOL DIVISION
Larkin Packer Co., Inc. • St. Louis, U. S. A.

A.S.T.E. DOINGS

(Continued from Page 34)

the cup in the membership drive this year, but Connie Hersam who dropped in from Philadelphia didn't give the boys much encouragement. Ford Lamb was on hand to give details of the Annual Meeting in New York in March and to urge a good attendance on the part of the host chapter. Jim Weaver was in from Pittsburgh and talked a bit about his year in office as president of a growing society. F. R. Palmer, Carpenter Steel Co. spoke on some of the problems of tool steel selections and use from the Tool Engineer's point of view. He illustrated his talk with over 50 slides.

Ninety-two members and guests sat down to a fine turkey dinner with all the trimmings at the February 8th meeting of **St. Louis** Chapter at the Melbourne Hotel. President Jim Weaver gave a very good talk on the why and wherefore of the A.S.T.E. The election of officers resulted in the following: Chairman, Douglas D. Burnside; Vice-Chairman, Charles Sinning; Treasurer, Harry Reheis; Secretary, Clarence Miller. Dr. D. R. Kellogg of the research division of Westinghouse Electric & Mfg. Co. was the speaker at the technical session. The Doctor was very adept at pulling out a sack of Bull Durham, or maybe it was Duke's Mixture, and rolling his own while in the proc-

ess of answering questions. It was a good thing the Mayor of the city wasn't present as he might have asked the doctor if he were trying to influence the citizens of St. Louis to save the 2c cigarette tax by rolling their own.

Philadelphia Chapter held its second anniversary party February 12th at the Penn A.C. in the spacious main ballroom. Their Ed Lafferty writes me that 2500 attended this get-together, but that sounds more like the census to me. Any way it was a successful party and no small credit goes to the untiring efforts of Paul Frankfurter. Among those present were Ray H. Morris, Hartford Chapter Chairman and Frank Crone, National Treasurer, L. V. Calhoun, Shop Supt. of the Philadelphia Navy Yard, Charles Plaff, General Fore. of the Frankford Arsenal and heads of many leading firms in this area. For information regarding the annual meeting in New York call Ed Lafferty at Rittenhouse 4340.

▼ ▼ ▼
The monthly meeting of the **Detroit** Chapter of the A.S.T.E. was held February 8, at the plant of the Carboly Company. After a dinner provided by the Carboly Company, Mr. W. G. Robbins was introduced by Detroit Chapter Chairman, Mr. Chas. W. Thiede. Mr. Robbins made a short talk welcoming the members to the plant, through which they were conducted in small groups by special guides. About five hundred went through the plant which we believe has the greatest manufacturing facilities for the production of cemented carbide products in the western hemisphere.

The Carboly Company moved into this plant last March, and it certainly was a privilege to make the trip through this plant.

The Detroit Chapter elected the following officers at this meeting for the coming year. Chairman, Clyde Hause; Vice-chairman, B. L. Diamond; Secretary, Clyde Mooney; Treasurer, Wm. Maier. The new officers will take office at the April meeting.

▼ ▼ ▼
South Bend's chapter meeting, held at the LaSalle Hotel on the evening of February 11, was as unusual as it was interesting to the 130 who attended. The speaker did not arrive until nearly 9:00, being held up by bad weather conditions. What did we do? We went right ahead.

One of our members, Mr. Frank Foote, who is as enthusiastic with the camera as he is loyal to our Chapter, came forward with a 16" camera and hundreds of feet of colored film, the fruit of his recent trip to Mexico. He showed pictures of a complete Bull Fight and described the various scenes in an excellent and instructive manner.

Now, the question is, how did a picture of a Bull Fight tie in with a technical session?—as Mr. E. B. Barber remarked when thanking Mr. Foote. The moral of the picture teaches all Tool Engineers to be careful when handling the "Bull."



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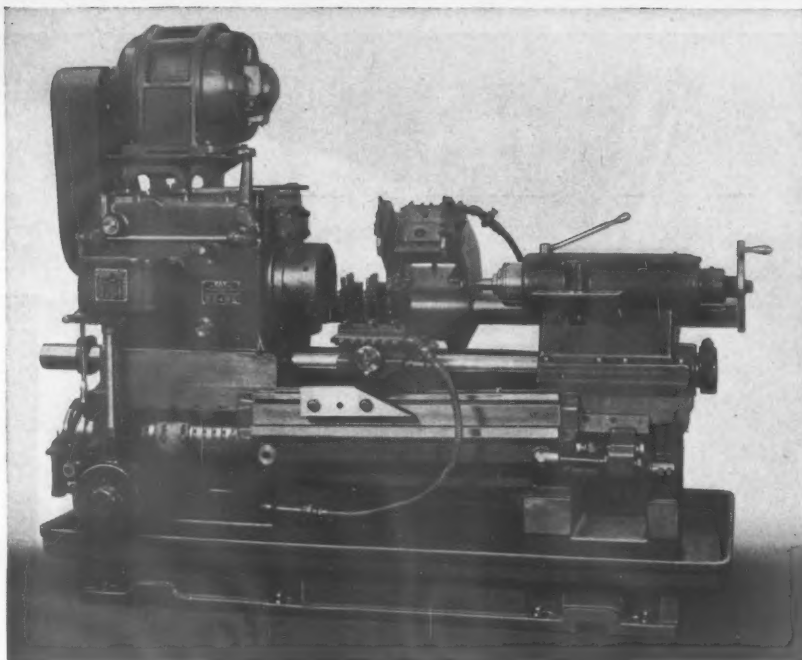
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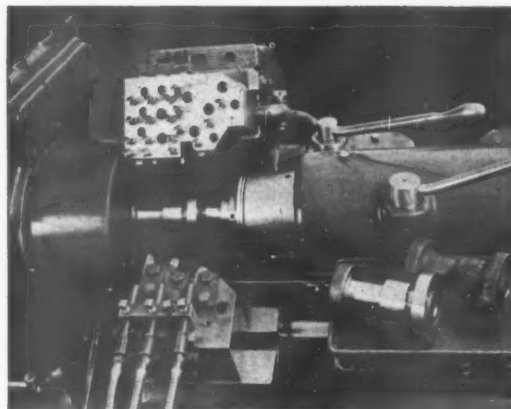


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Another

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The New 16" Fay Automatic Lathe



A HEAVY DUTY MACHINE designed to take full advantage of modern hard-alloy cutting tools, it will transmit power in excess of 50 H. P. It will swing $12\frac{1}{2}$ " over the carriage and $17\frac{1}{2}$ " over the center bar and back-arm bar, and in it are embodied all the features of **COMPLETELY AUTOMATIC OPERATION, RIGID TOOL MOUNTING and AUTOMATIC TOOL RELIEF** that make the Fay Automatic Lathe a real **PRODUCER of PARTS at a PROFIT.**

HEAVY DUTY is no longer determined by size of work and depth of cut alone. Here is a close view of the tooling for rough turning and facing a Cluster Gear. With carbide tipped tools the actual cutting cycle of this operation is only 15 seconds. On jobs such as this, the high surface speeds demanded by hard-alloy cutting tools — to attain their maximum efficiency — require a machine of exceptional rigidity and power. The 16" Fay meets these demands with power to spare and will prove a *Profitable Investment* in production of this type of work.

The 16" Fay Automatic Lathe is made in five standard lengths, with a capacity between centers of 21", 33", 51", 69" and 87" respectively. Submit your problems to us for an economic solution.

JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF: SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . .
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MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS

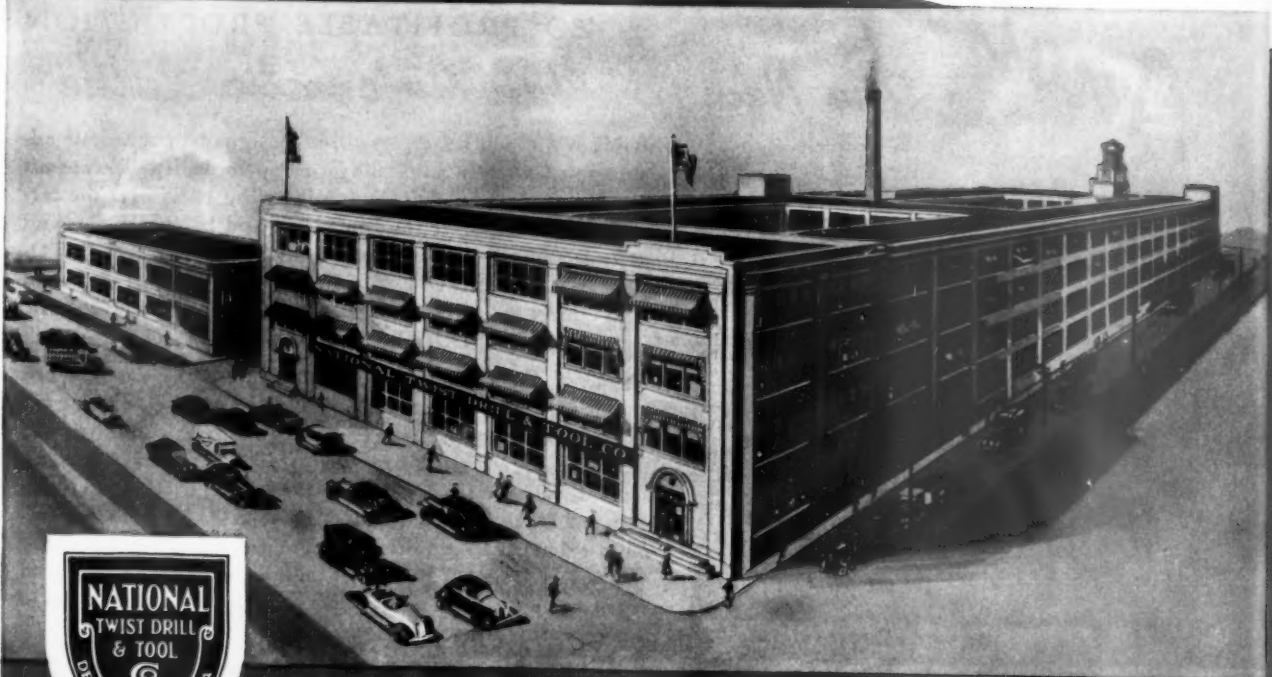
● The Detroit Plant
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Milling Cutters, Ream-
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At the Wrentham, Mass.—Winter Bros. Co.—plant are found complete facilities for the manufacture of standard and special Taps and Dies.

Together the two units serve the needs of Metal Cutting Tool users from coast to coast—and abroad.



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TAP AND DIE DIVISION
WINTER BROS.
WRENTHAM, MASS.

RECLAMATION OF CUTTING OILS

(Continued from Page 14)

tated on a vertical axis. This produces the centrifugal clarifier, or centrifugal separator, as shown in Figs. 4 and 5.

The commercial uses of these centrifugal machines are many and varied. In some cases the application is quite simple. For example: in the manufacture of varnish it is necessary to remove the dirt which is introduced through the raw materials of manufacture, either by settling or centrifuging. Gravity settling requires much time and is not always complete, whereas centrifugal clarification is rapid and

complete. Pigmented finishes, such as enamels and lacquers require the removal of dirt and bits of oversized pigment or a rough finish results which may require much sanding to give a smooth finish.

Lubricating oils in most of the big power plants are kept free from dirt and water by continuous centrifuging and in many railroad shops the oil reclaimed from car journal waste and Diesel engines is reclaimed centrifugally. Many attempts have been made to develop a simple and inexpensive process for reclaiming used automobile oil. In this the failure has not been due to any fault of the centrifuge, but rather to the necessity for

keeping the various grades and types of oils separate and the impossibility of doing so.

Some Complicated Applications

Let me describe a few of the more complicated applications. The demand for motor fuel far exceeds the supply of natural gasoline. Methods for cracking heavier oils to meet this demand have been developed but they produce a very crude product which requires much refining. One step in the refining process is washing the distillate with strong sulphuric acid for the removal of unsaturated hydrocarbons and sulphur compounds and it is necessary to remove the acid sludge so formed promptly and completely to avoid going too far with the chemical reaction.

Crude vegetable oils, such as cotton seed, corn and cocoanut, are unfit for food products. Oils of this type, when mixed with the correct amount of caustic soda solution, become edible oils and yield crude soap as a by-product. The centrifuge effects the separation of refined oil and soap stock at just the right point to give the greatest yield of oil and economy of caustic.

Perhaps you may wonder just what connection there is between this discussion and that which was given at your last meeting by Mr. Pashek of the Socony Vacuum Oil Company. The connection is very simple and easily established. Mr. Pashek told you of the importance of selecting the right brand and the right quality of oil for use as a coolant or cutting lubricant. My mission is to try to tell you of the means available for getting the most value out of this oil. The way to get the greatest value out of the oil is to keep it clean. It is an accepted fact among machine shop operators that clean oil will cause less wear and tear on the moving parts of automatic screw machines, such as the circulating pumps, tool slides, etc.

Clean oil will cause less wear on the tools and thereby improve their cutting effect. This shows a saving in two ways. First, there is less time lost because of grinding and setting of tools. Second, production will be greater in quantity and quality between tool grinds. The correct method for keeping cutting lubricants in first-class condition depends entirely upon the shop conditions. In some shops, as shown on schematic drawing, it is sufficient to clarify or centrifuge only that oil which is wrung from the chips that have been taken from the machines. In other shops it may be wise to connect all of the machines to a central system where the oil drains continuously to a dirty oil sump from which it is lifted and pumped through centrifuges to clean oil storage and thence back to the machine. In some shops it may be wise to heat the oil for the purpose of sterilizing. Much has been said pro and con on the necessity of heating oil before centrifuging. Perhaps the most important and logical reason for heating oil before centrifuging is the fact that heating it reduces viscosity and

(Continued on page 46)

OUR "MIGHTY MIDGET" UNISHEAR HAS SAVED US PLENTY ON TRIMMING DIES!



Stanley "Mighty Midget" Unishear, capacity 18 ga. hot rolled steel, \$54.00. No. 16, capacity 16 ga. and No. 14A, capacity 12 ga. are other portable models.



THE best way to cut out the cost of expensive trimming dies is to put a Stanley Unishear on the job. It cuts as you feed, follows any line accurately, and leaves smooth, finished edges. You tie up no investment, for your "Mighty Midget" will handle other kinds of fast-cutting jobs around the shop, with a capacity of 18 ga. hot rolled steel.

Investigate the tool that has made hand-cutting obsolete! There's a Unishear just right for your work, which your Stanley distributor will be glad to demonstrate. Or write for literature. Stanley Electric Tool Division, The Stanley Works, 149 Elm Street, New Britain, Connecticut.



Three models of Stationary Stanley Unishears cut up to $\frac{3}{4}$ " boiler plate. Handle large sheets easily, starting cuts inside the sheet. Cut curves down to $\frac{3}{4}$ " radius. Ideal for large shops.

STANLEY UNISHEARS

THE ELECTRICALLY DRIVEN HAND SHEARS



3 OPERATIONS AT ONCE

Save 50% on Machining Cost

● You, too, can look forward to such savings, when you replace old machine tools with these new Gisholts. Previously, this manufacturer performed three separate operations—drilling, countersinking and tapping—in the manufacture of a special nut. Now, with a Gisholt No. 5 Ram Type Universal Turret Lathe, these operations are all done at one time at a 50% reduction in cost; from 16 cents to 8 cents.

Perhaps it isn't fair to compare the old methods with the new. Nor is it quite fair to compare obsolete machine tools with the greater speed, accuracy and earning capacity of these new Gisholts. But the fact remains that old equipment can't compete with the greater efficiency of the new Gisholts being used in many plants these days. If you haven't all the facts, ask us to send them to you.



★ *The heavy, rigid construction of the Gisholt Turret Lathe, with one-piece bed and headstock, reduces vibration to a minimum—permits multiple cutting at high cutting speeds. This particular machine, equipped with bar feed, threading attachment and 3-jaw chuck, handles the variety of work shown above. Literature on Gisholt Turret Lathes is yours for the asking.*

"YOUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS"



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MACHINES AND TOOL ENGINEERS

(Continued from Page 13)

forget the necessity of simultaneously expanding production. The prevalent notion that the problem of production has been solved has led many people to conclude that all we need to do to remove our economic difficulties is to increase, by some means or another, the money income of the people—that nothing else is of any importance. No matter how much we may increase wage rates with a view to expanding purchasing power, we will not find available in the market place the goods which minister to the satisfaction of human wants unless they are produced. The standard of living can be raised only through the production of more food, clothing, shelter, comforts and luxuries."

A recent study shows that the potential market for electrical appliances is 16 billion dollars, and to satisfy this

need one million people would be employed for four and a half years. Add these well-recognized needs: electrification of homes; greater quantity and quality of housing; central home heating; air conditioning in homes, buildings and factories; road building and improvement; more, better, and lower-priced aircraft; modernization of railroads; and greater variety of foods. There's work to be done!

A Glimpse at the Future

A New York state banker who believes that the best way to determine what the products of tomorrow will be is to ask the men who develop them, surveyed top-notch researchers in this and other countries. His question was: "What will be the outstanding contribution from your field of research during the next three years?" Here are some of the developments of tomorrow:

The causes and cures of staling in baked goods are beginning to be found; food oils present in food products that cause rancidity will be

treated to halt deterioration for as long as two years; marketing of ready-to-serve coffee in tin cans is being tested; dispensing units, coin-operated, are being adopted to reduce the sales cost and pilfering of newspapers, bread, fruit, cold drinks, and canned goods—even canned fishing worms!

Fabrics treated with resins will be moisture, fire, wrinkle and shrink proof; the extrusion of synthetic textiles in sheets rather than in fibre will eliminate the necessity of weaving into cloth; photosquaring, a process used in weaving which puts the threads at right angles to each other, will enable curtains to stay straight after washing; replacement of tin containers for motor oil by specially treated paper ones is imminent.

A new molding method for plastics will bring about a substantial reduction in the cost of dies; combinations of plastics with rubber will replace much of the metal used in printing type and electrotypes; petroleum incorporated in plastics will make them self-lubricating.

The house of the future will be made of glass, steel and plastics, with rubber windows; panel type heating, in the ceiling or lower portion of the wall, will produce bodily comfort at intervening air temperatures as low as 60°; vacuum concrete, from which the forms may be removed in an hour, will be painted with a one-coat cement finish which binds with the wall so that it cannot crack or scratch off.

Charles F. Kettering stated, "By 1950, people will be no more willing to live in a 1937 house than they are willing today to drive a 1925 model car. America is going to be rebuilt, make no question about it."

Glass, it is indicated, is beginning an about-face. The future window pane and bottle will be made of plastic, paper or rubber—while the glass business of tomorrow will be directed toward building blocks, fabrics, insulation and other new uses. Silk stockings may be replaced ultimately by hose made of glass.

Alloys capable of withstanding operating temperatures of 2500° will become available, stimulating the chemical industry; a process for direct casting of copper, aluminum and their alloys in rods and in shapes now difficult to roll are on the way; new casting processes will produce material more nearly to finished size.

Outstanding chemical engineers agree that the hydrocarbons of petroleum will furnish the industrial chemicals of the future; they refer to coal as a complicated organic compound from which we will synthesize endless chemical compounds; then, as Mr. B. H. White, who made this survey, observed, "We shall realize that the last thing we should do with coal is burn it!"

With our research laboratories spending \$750,000 every working day in the improvement of existing products and the development of new ones, we shall not lack the means for new enjoyment of life. The problem of the tool engineer will be to make their economical production possible.

(Continued on Page 56)

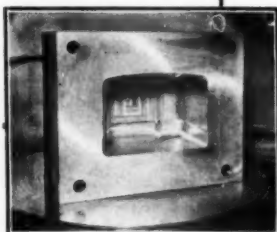
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"We used to shape our plate stock at a cost of 4¢ to 5¢ per square inch—now we grind it on a Blanchard No. 18 at a cost of less than 2¢ per square inch."

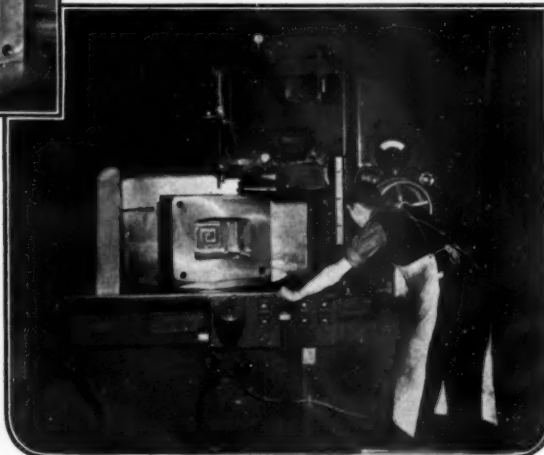
THAT is what one leading die manufacturer said about his costs—and what scores of others are saying about Blanchard Grinding. They use their Blanchards for machining flat surfaces on die bases, punch holders, stripper plates, sectional die parts, drawing dies and hold downs, blanking dies; also on die blocks for forging, die casting and plastic molding.

The Blanchard No. 18 Surface Grinder and wheels manufactured by Blanchard are the ideal combination for reducing the cost of machining flat surfaces. The Blanchard No. 18 catalog and booklet "Work Done on the Blanchard" give the whole story. Send for your copies today.

The cost of finishing the outer surfaces of this radio cabinet die, 18" x 22" x 11", 1/2" stock per side, was cut in half when ground on the Blanchard No. 18, using Blanchard Sectors Wheel.



**BLANCHARD
MACHINE CO.**
64 STATE STREET
CAMBRIDGE, MASS.



SCULLY-JONES PRODUCTS

Furnish Complete Tool Setups



STANDARD TOOLS

DRILL CHUCKS	CORE DRILLS
TAP CHUCKS	REAMERS
CLOSE CENTER TAP DRIVERS	LATHE CENTERS
CUTTER CHUCKS	BORING BARS
CUTTER CHUCK ADAPTERS	MILLING MACHINE ARBORS
CENTER DRILL CHUCKS	SOLID SPACING COLLARS
QUICK CHANGE CHUCKS	ADJUSTABLE SPACING COLLARS
USE-EM-UP SLEEVES	COUNTERBORES
PLAIN SLEEVES	COUNTERSINKS
USE-EM-UP SOCKETS	END MILLS
PLAIN SOCKETS	HOLLOW MILLS
ADJUSTABLE ADAPTER ASSEMBLIES	WOODRUFF KEYWAY CUTTERS
ADJUSTABLE EXTENSION ASSEMBLIES	TURRET TOOL HOLDERS
FLOATING HOLDERS	REVERSE SPOT FACERS
TENSION TAP HOLDERS	STELLITE SHELL END MILLS
COMPRESSION TAP HOLDERS	FEED AS YOU NEED CHUCKS

SPECIAL TOOLS

ARBORS	REAMERS
BORING BARS	WEAR RESISTING ALLOY TOOLS
SPINDLES	SPECIAL ASSEMBLIES
FACING AND CHAMFERING TOOLS	ADJUSTABLE ADAPTER ASSEMBLIES
CORE DRILLS	HOLLOW MILLS
COUNTERBORING TOOLS	BORING HEADS
HOLLOW MILLING HEADS	RECESSING TOOLS

Standard Tools — Write for Catalog No. 400

Special Tools — Write for Estimate



SCULLY - JONES AND COMPANY

1905 SOUTH ROCKWELL ST.

CHICAGO, ILLINOIS

New Literature

of Interest to the Tool Engineer

Make your request for literature or information on New Equipment direct to manufacturers or publishers named, mentioning "The Tool Engineer."

Carboloy Company, Inc., 11145 East 8 Mile St., Detroit, has issued Carboloy Engineering Bulletin GT-120, with recommendations for cutting steel with carbide tools. This is the first bulletin issued by Carboloy on this subject and contains comprehensive instructions based on extended research and development work.

A practical feature of this bulletin, which is of especial appeal to Tool Engineers and shopmen concerned with metal cutting, is a set of charts specifying carbide grades for various uses, recommended starting speeds, general range of practical feeds, recommended tool rakes and clearances for a wide range of steels. Of particular interest, in our opinion, is that the charts also provide a means for determining the power required for each material.

Govro-Nelson Company, (Hole Engineering Service, Detroit, Application Engrs. & Distributors) has an interesting Bulletin covering G-N Automatic Drilling Units, using the principle of cen-

trifugal force for protected feed pressure. The Bulletin shows various adaptations of the units, enough to show their wide range of uses. It is thought provoking, should be scanned. Distributor's tor's address 307-8 The Boulevard Bldg., Detroit.

A pocket size 16 page booklet has been issued by the Junkin Safety Appliance Company of Louisville, Kentucky, entitled "Stamping Presses, Their Safety Uses and Abuses. The little booklet is the work of three authors who have devoted the past twenty years to a study of safety measures in press operations. While it was primarily prepared as a guide for Insurance Inspectors, Factory Inspectors and Safety Engineers, it is of great interest to the shop executive interested in the metal stamping business. The many features given may indirectly be the means of preventing press accidents in your plant. Write for a copy, addressing your request to J. I. Junkin, 935 W. Hill Street, Louisville, Ky.

Meehanite Research Institute of America, Inc., 311 Ross St., Pittsburgh, Pa., is out with Bulletin No. 10, which shows, in 12 pages, five principal reasons why Meehanite is used so extensively for pressure castings. Included are numerous illustrations of service applications and a table of pressure temperature ratings made from tests on Meehanite valves.

The bulletin is of especial interest to Tool Engineers having to do with pressure tight castings, is replete with data and typical applications. Incidentally, it suggests ideas for the casting of intricate shapes—have it on file.

Primarily issued for turret lathe operators, but, as we see it on review, of interest to Tool Engineers, designers and tool layout men, is an informative 4 page organ—Blue Chips—issued by the Warner & Swasey Co., Cleveland, Ohio, makers of turret lathes. Besides showing tooling set-ups and charts, the little newspaper (it really is that) contains pithy comments from men on the line, answers to questions, as well as chatty editorials by Bill Pelich, editor. It is interesting and breezy, is issued monthly, and we recommend it to readers interested in turret tool applications.

A new descriptive folder of the Continental Band Filing machines has been prepared by Continental Machines, Inc. of 1304 Washington Avenue, South, Minneapolis, Minnesota. Specifications and illustrations are given about the bench filing machine, the model FM, and the floor model, the FC Continental Band Filer. Both of these machines work by the continuous filing method. DoAll Contour machines built for external and internal sawing and polishing as well as filing also are manufactured by this same company. Write for a copy mention THE TOOL ENGINEER.

(Continued on page 64)



PRECISION
Your Constant Guarantee of Accuracy

DANLY MACHINE SPECIALTIES, Inc.
2130 So. 52nd Avenue, Chicago, Ill.

Danly Die Sets and Die Makers' Supplies from the 9 Danly Branch Stocks

LONG ISLAND CITY, N. Y. 36-12 34th STREET	PHILADELPHIA, PA. 3913 N. BROAD STREET
DETROIT, MICHIGAN 1549 TEMPLE AVENUE	ROCHESTER, N. Y. 16 COMMERCIAL ST.
CLEVELAND, OHIO 1745 ROCKWELL AVENUE	MILWAUKEE, WIS. 513 EAST BUFFALO ST.
DAYTON, OHIO 990 E. MONUMENT AVE.	

DUCOMMUN
Metals and Supply Co.
Los Angeles—San Francisco

23,000,000 stampings have been made in this die mounted in a Danly Precision Die Set

DANLY PRECISION DIE SETS

DANLY DIE SETS and DIE MAKERS' SUPPLIES

Because

*they reduce the cost
per piece machined*

**HAYNES STELLITE "2400" TOOLS
are STANDARD**

on these Boring Jobs...

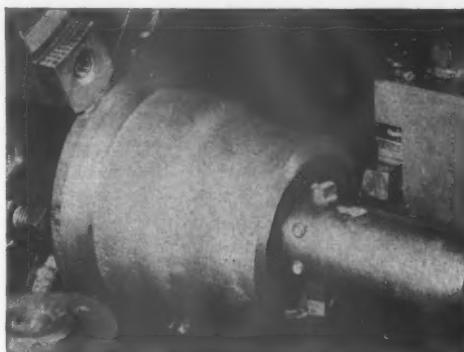


BEARING CARRIER—Boring the 4-inch I.D. and turning the 7½-inch O.D. of a cast iron bearing carrier for an oil field pumping unit with Haynes Stellite "2400" tools at 93 surface feet per minute.

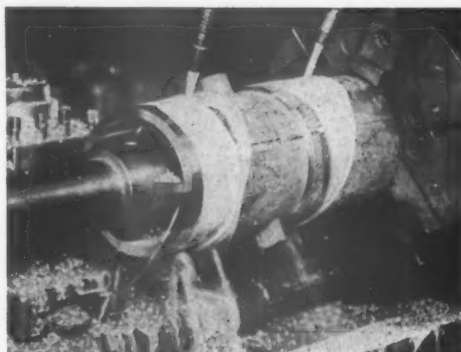
WEAR STRIPS—Haynes Stellite engineers will gladly show you how Haynes Stellite wear strips can reduce wear on your boring bars. Information on sizes, styles, and prices will be furnished on request. Address Kokomo, Indiana, or the nearest district office—Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, San Francisco, Tulsa.

High-production metal-cutting tools

The words "Haynes Stellite" and the designation "2400" are trade-marks of Haynes Stellite Company.



STAINLESS STEEL—Boring and rough- and finish-facing a 4½-inch O.D. poppet valve nozzle of cast 18-8 stainless steel with two Haynes Stellite "2400" tool bits. More than 50 pieces are machined per grind.



BRONZE BEARING—Boring the 6-inch I.D. and turning the 7-inch O.D. of a bronze bearing for the slow-speed shaft of an oil field pumping unit with Haynes Stellite "2400" tools at 524 surface feet per minute.

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation



New York, N. Y.

Kokomo, Indiana



ECONOMY AND EDUCATION

(Continued from Page 9)

A rather new industry which is fast becoming a major one is the plastic industry. Should the discovery of new substances and the development of new methods and practices continue in this plastic industry it will soon become one of our major industries. It is not remote to the time when a multitude of articles touching our everyday life will be made of plastics, more beautiful, more adaptable, more important and more economical. The subject "Tooling for Plastics" will receive considerable attention.

The session on "Precision Small Gears" was selected because of war interference with the source of supply of much of the equipment used in the production of precision small gears. While many sections of the country are not concerned with this problem, other sections are vitally interested and need substitutes for the foreign machines which heretofore have been used in the manufacture of precision small gears so essential in meters, certain gaging instruments, optical and medical instruments, as well as a long list of similar items. This session on "Precision Small Gears" is intended not only to point out how domestic industry is meeting the problem but to encourage still further

development by a nation which is second to none in mass manufacture, machine and tool development.

Every year brings remarkable changes and improvements in materials used for cutting or removing metal and each new cutting material brought into use seems to indicate that the ultimate has been reached. Yet new materials and tools constantly come into use, far outdoing the old ones. That there must be specialization even in the field of cutting materials begins to be obvious, if utmost economy in usage is to be obtained. Too often we attempt to adapt a new cutting material to the entire field of metal removal. True we have paid the price of such errors in judgment but the development must go on. The session on "Cutting Tools and Materials" is expected to indicate special usage for various types of materials, and speakers from each of the several different types and classes of cutting materials will present authentic information on this timely subject.

A deviation from the general rule of the A.S.T.E. practice is planned in connection with this 1940 Annual Meeting, in that the ladies are invited. A special program has been arranged for them by our host chapter, New York-New Jersey No. 14. This program includes a trip behind the scenes in Macy's—the largest department store in the world, a trip through the Bureau of Standards of Macy's will give some idea of how merchandise is selected for quality and utility. In the ladies program is a visit to Radio Center, observation and participation in a radio program, sight-seeing tours, bridge teas, etc.

Between sessions there will be an opportunity to visit many different plants in the New York area, although no regular bus schedule will be maintained; provision will be made for entry to nearly any plant in that section provided there are not restrictions because of government work. An examination of the detailed program in this issue will show the value of the ambitious and important program arranged for you and the many progressive production executives who will join with A.S.T.E., in the most instructive interesting get-together Tool Engineers have yet had.

RECLAMATION OF CUTTING OILS

(Continued from Page 40)

reducing viscosity increases the amount that can be put through a centrifuge and still produce good work. Contrary to this is the fact that sometimes the heating of oil causes certain varieties of foreign matter to go into solution and this objectionable foreign matter may precipitate again as the oil cools down.

NEXT MONTH

The April issue of "The Tool Engineer" will carry digests of the important papers presented before the A.S.T.E. National Annual Meeting. This will be an issue you will want to keep and refer to for some time to come. Be sure to save it—look for it April 4.

TRUE
PRECISION
plus PRODUCTION-
with
GARDNER-
GRINDING!



ONE more example of the possibilities of PRECISION Disc Grinding is seen here. This hose No. 84-30" Gardner Grinder, with 5 1/2" diameter spindles and weighing some 15,000 pounds, turns out roller bearing races ground on both faces, AT THE RATE OF 60 TO 75 PER MINUTE. They are held within .0005" to .0005" for parallelism, and .004" for uniformity. The races are fed between the opposed grinding members by means of a special rubber roll feed fixture. Truly, this is a job which combines PRECISION AND PRODUCTION. Find out about PRECISION DISC GRINDING—ask for our Booklet, "MODERN METHODS of GARDNER-GRINDING!"

AN IMPORTANT FACTOR IN PRECISION DISC GRINDING—HEAVY-DUTY GARDNER WIRE-LOFT ABRASIVE WHEELS

GARDNER MACHINE COMPANY

442 East Gardner Street Beloit, Wisconsin, U. S. A.

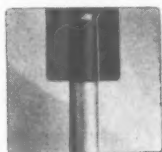
2,130 Miles of Wire Coiled With Carboloy Point

L. A. Young Spring and Wire Corporation, Detroit, reports that on one Carboloy coiling point they coiled more than 11,250,000 ft. of 7½ gage Swedish commercial type "OT" valve spring wire. In this plant Carboloy Points average 30 times the life of High Speed Steel points per refinish and require only one-half the time it takes to refinish H. S. S. points. Due to the extra



amount of stock removed in refinishing H. S. S. points, Carboloy outlasts H. S. S. 500 to 1 per inch of wear. Carboloy-tipped pitch tools and arbors outwear H. S. S. at approximately the same ratio. This performance is indicative of the results obtained by this company in coiling various sizes of steel wire from .008" dia. to ½" dia. for such products as automobile seats, clutch springs, brake springs, window regulator springs, mattress springs, etc.

Carboloy Sizing Dies For Bolts, Nuts, Roller Chain Cylinders, Etc.

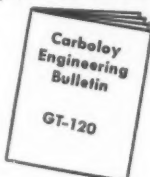


Carboloy sizing dies for bolt and rod work effect closer tolerances on pitch diameter of rolled thread, longer life for thread rolling dies and less down time on machine. Furnished in rounds or shapes for sizing bolts, nuts, etc.

As an indication of the economy of Carboloy sizing dies, one mill reports sizing 1,900,000 pieces of .07-.10 carbon drawn stock, with die wear of .0001". Reduction was .070".

Steel Cutting Recommendations Contained In New Carboloy Engineering Bulletin

A new engineering bulletin recently issued contains basic data on requirements for cutting steel with Carboloy tools. Gives tool design, set-up, coolants, chip breaking and machine requirements. Particularly valuable is a table giving specific recommendations for speeds, feeds, Carboloy grades, tool rakes and angles, etc. Ask for Carboloy Bulletin No. GT-120.



Carboloy Masonry Drills

Your maintenance man would like to know about the Carboloy Masonry Drill. Drills concrete, brick, tile, etc., 75% faster than old methods. Ask for leaflet GT-103.

When Warner & Swasey put Carboloy on 1500 small-lot jobs . . .

**MACHINE CAPACITY
INCREASED 43%***

**MACHINING COSTS
DROPPED 25%***

*Average of all Carboloy jobs

Is it economical and practical to use cemented carbide on small-lot, diversified machining work? That's the question Warner & Swasey asked themselves—set out to find the answer to in their own plant. Comparable to job shop work was the problem of W & S:—Lots range from 20 to 100 pieces. Steel, cast iron, bronze, etc., are machined. Operations include the usual boring, facing, turning, chamfering, etc.

To meet these conditions, a period of adjustment followed: Tool styles, sizes and grades (of Carboloy) were "boiled down" to a minimum number of general purpose standards; facilities for rapid grinding and maintenance of carbide tools

established; necessary controls on carbide use provided.

With this accomplished, the wheels started turning! Simple jobs at first. Then the "tough" ones—such as taking ¾" to ½" roughing cuts over 37 linear inches of S.A.E. 1050 spindle forgings. Today 1500 successful Carboloy jobs are "on the record," with an average increase of 43% in machine capacity, and an average drop of 25% in machining costs. "Extra dividend" is the valuable source of carbide tool information now available to their sales-engineers—the men you rely upon for W & S Turret Lathe recommendations.

A 12-page booklet gives the facts—tool specifications, grades, speeds, feeds, etc. Yours upon request.

CARBOLOY COMPANY, INC., 11145 E. 8 Mile St., DETROIT, MICHIGAN

CHICAGO • CLEVELAND • NEWARK
PITTSBURGH • PHILADELPHIA
WORCESTER, MASS.



Authorized Distributors:
Canadian Gen. Elec. Co., Ltd., Toronto
Hartley Wire Die Co., Waterbury, Conn.

CARBOLOY

TUNGSTEN CARBIDE—TANTALUM CARBIDE—TITANIUM CARBIDE

FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS
★ FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE ★

PRODUCTION PERSPECTIVES

(Continued from Page 32)

a point that at the present time shipments are at the rate of 66 2/3 per cent over the average monthly rate for the year 1939. The company now has a backlog of unfilled orders which bids fair to insure capacity production throughout the present year."

The National Tool Company, Cleveland, Ohio, announces the appointment of Mr. L. E. Phelps who is to have charge of the Company's Milwaukee office effective February 15th.

Mr. Phelps was previously connected with The Fellows Gear Shaper Company for the past 26 years.

L. J. Purdy, general manager of the Dodge truck plant, Detroit, last week announced the appointment of Russell H. Dragsdorf as plant manager. Mr. Dragsdorf, who for the past several years has been Dodge truck plant engineer and labor relations supervisor, has been associated with Dodge in Detroit for 22 years. A. S. Anderson, for several years in charge of the special equipment engineering department of the Dodge truck plant, has assumed the additional duties of labor relations supervisor. Harold Hocker becomes plant engineer.

WEST COAST

Working virtually around the clock

on more than \$43,000,000 in backlog orders, three San Diego, Cal., aircraft companies announced Feb. 8 they had reached an all-time employment high. The three plants, Consolidated, Ryan and Solar, have 5365 men and women in employment, representing a monthly payroll of \$675,000. Executives of the three firms said approximately 4100 additional employees would be required before the factories reached their employment peak about July 1. Consolidated, which had 2630 employees six months ago, now has 4000, and is taking on 200 workers a week. Included in this total are 25 a week from a Kansas City technical school and 15 from a Glendale training center. Rapid expansion of aircraft production has resulted in speeding up the city's vocational school special aircraft trade classes. Local industrial leaders are anxious to fill the new jobs locally. Eight instructors have been made available to the school by the factories to teach 1800 prospective pupils on the school's waiting list.

Edmund T. Price, president, Solar Aircraft Company, San Diego, Cal., said Feb 8 that he had offered free to the Finnish government his airplane heating device, with royalty rights waived, and that the gift had been accepted.

The Vultee Aircraft Company, Downey, Calif., began work February 7 on a \$9,000,000 order for 144 swift interceptor pursuit planes for the Swedish Government. The company said 900 men were added to its normal force of 1,600 employees. The order more than doubled its backlog.

EAST

Old-timers in Springfield industry, 180 of them, with total service amounting to nearly 6,000 years of labor, were honored recently by the Employers' Association of Western Massachusetts at the Hotel Kimball as a climax to the annual Western Massachusetts industrial day program of the organization. The daddy of them all, Thomas Murnane of the Chapman Valve Manufacturing Company, was presented a radio because of his 59 years of unbroken employment at the Indian Orchard plant. Also honored were six "modern pioneers." They were John C. Garand, inventor of the rifle bearing his name; Vincent T. Malcolm, metallurgical engineer at the Chapman Valve Manufacturing Company since 1921; Royal Franklin Sickles, president of F. W. Sickles Company; E. Lovell Smith, chief engineer and director of Package Machinery Company; Edward A. Wolfert, air conditioning engineer at the Westinghouse and John Harvey Ashbaugh, design engineer at Westinghouse.

Wages of workers in manufacturing industries throughout Rhode Island were 8.1 per cent higher in January than in January 1939. Most outstanding of the payroll gains was that of 50.2

(Continued on Page 56)

Two Special Rigidmils Replace 15 Other Machines



Save Capital, Overhead, and More than \$2000 Monthly on Cutters



Standard Rigidmils

Substantial savings are being made on a wide variety of milling by standard Rigidmils. Two of these, No. 0 and No. 1, are illustrated and described in pamphlets shown above. Write for copies today. Ask for Bulletins 382 and 383.

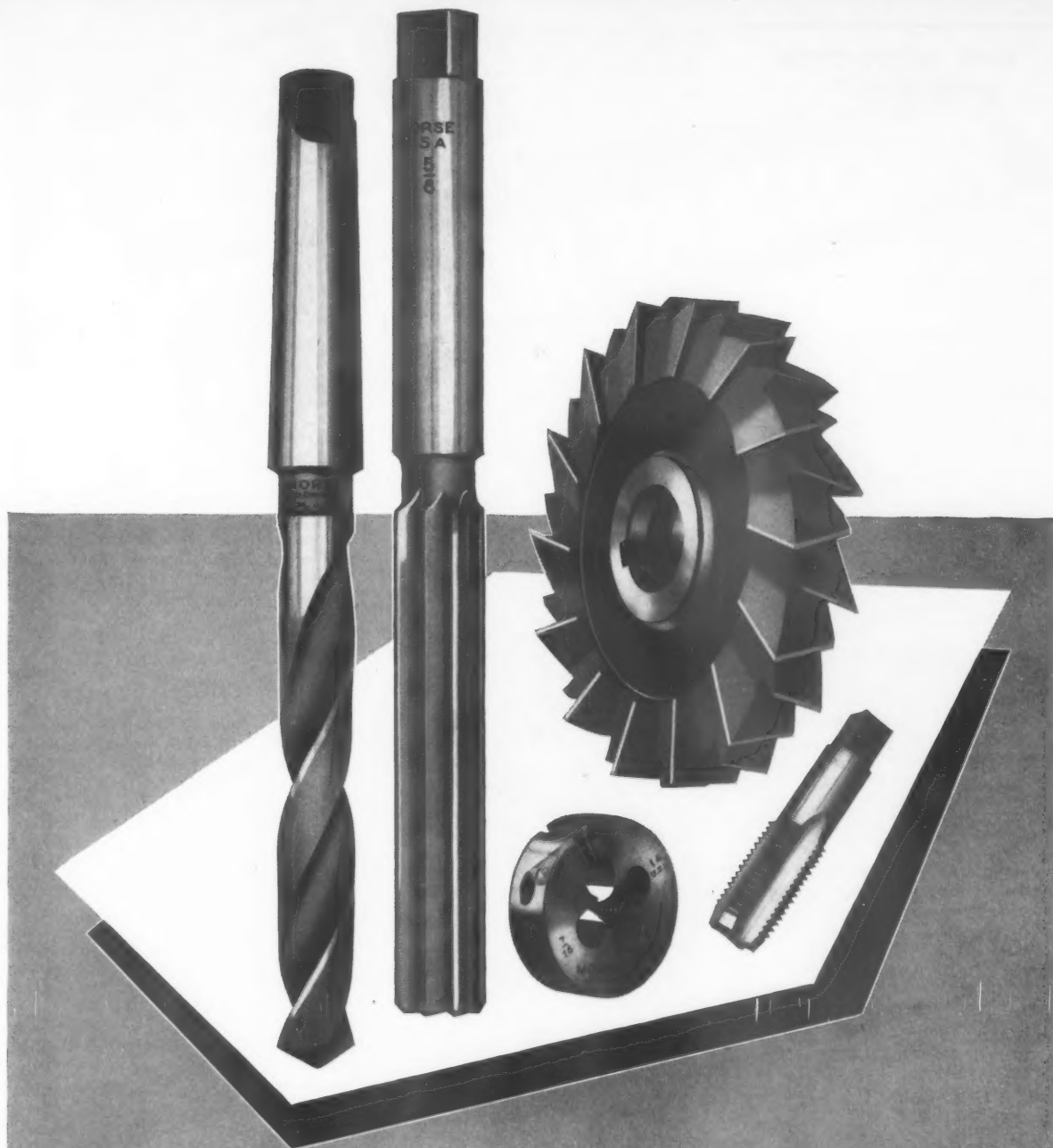
Chamfering 140 teeth on steel ring gears is the job shown above. Formerly this work required 15 machines, two operators, and cutters costing \$2500 to \$3000 a month. Now, two operators run two special Sundstrand Rigidmils, turn out same volume of work much easier, in less space . . . and cutter cost averages only \$200 a month! No tricks, no mirrors, no foolin'. Ask our Engineered Production Department for details. Send samples and data on your milling problems. Our estimates will show if we can save you cash.

Sundstrand Machine Tool Co.
2532 Eleventh St., Rockford, Illinois, U. S. A.

RIGIDMILS-STUB LATHES

Tool Grinders - Drilling & Centering Machines
Hydraulic Operating Equipment - Special Machinery





THE POINT OF PROFIT IN TODAY'S MACHINES IS AT THE
WORKHEAD WHERE THE TOOL MEETS THE JOB.
FIRST QUALITY CUTTING TOOLS CAN OFTEN MEAN
ALL THE DIFFERENCE BETWEEN PROFIT AND LOSS.

MORSE

**THERE IS A
DIFFERENCE**

TWIST DRILL AND MACHINE COMPANY

NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. - - - CHICAGO STORE: 570 WEST RANDOLPH ST.

NEW PRODUCTION EQUIPMENT

(Continued from Page 19)

tator Dresser Co., 5074 Park Avenue, Sycamore, Illinois.

Called the "Instant Heat" because it heats instantly upon touching the wire or terminal to be soldered, this tool is ideal for all kinds of light soldering and, being hardly larger than a lead pencil easily reaches and solders in hard-to-get-at places.

Heating stops instantly upon taking the carbons away from the wire or terminal so that as soon as soldering is finished this tool can be put away in

the kit ready for the next job. Can also be laid down without fear of scorching article it touches. Current is used only when in actual contact with work.

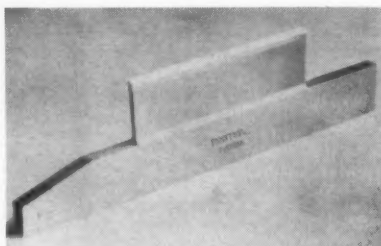
Complete unit includes transformer and soldering tool. Size of tool is 6 3/4 by 3/8 inches in diameter, power consumption approximately 80 watts. Shipping weight 2 1/2 pounds.

▼ ▼ ▼

Centerless grinding rests for any type of machine or grinding operation, faced with a tough, slow wearing alloy, are obtainable from Fansteel Metallurgical Corporation, North Chicago, Ill.

The hard facing, "Tantung," is a patented Fansteel alloy composed of hard particles of tantalum and tungsten carbide, uniformly distributed and firmly

embedded in a strong, tough matrix. Tantung differs from conventional hard facing materials in that the presence of tantalum carbide not only contributes to hardness, but imparts a peculiar lubricating characteristic which improves re-



sistance to wear. The alloy successfully withstands the severe service of centerless grinding operations, outlasting the hardest types of steel blades by a wide margin.

The Tantung facing, which is made in bar form, is firmly affixed to the steel supports by a special brazing process perfected in the Fansteel plant. Complete blades are manufactured to specification, Tantung facing is applied to existing blades furnished by users, or Tantung bars are obtainable for those equipped to do their own brazing.

Worn out blades can be reclaimed by application of Tantung facings, and when the Tantung facing itself finally wears out, a new facing can be applied, thus giving grinder blades indefinite life.

▼ ▼ ▼

Illustrated as light bevel stamps which will not only prevent accidents from mushrooming and spalling, but due to the new alloy steel used, it is possible to have a stamp with the strength of ordinary heavy bevel stamps while at the same time being 35% lighter. This lightness makes the light bevel safety stamp much easier to handle, and in stamping finished surfaces a far greater degree of accuracy is possible. Full details may be had by writing M. E. Cunningham Co., 169 E. Carson Street, Pittsburgh, Penna.



▼ ▼ ▼

A new vise, designed for production machine work, is offered by Larkin Air Vise Company of Portland, Connecticut. As its name implies the Larkin Air Vise is pneumatically operated, which, it is claimed saves a surprising amount of time in handling material, particularly

(Continued on Page 52)

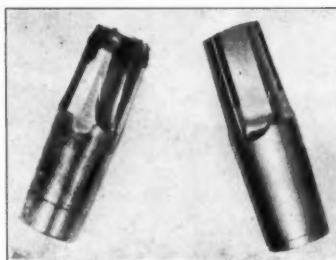


Increased facilities afforded by our new factory enables us to offer you even better tools and service than in the past on carbide tipped tools

GROOVING TOOLS
MASONRY DRILLS
COUNTERBORES
TURNING TOOLS
LATHE CENTERS
FACING TOOLS
BORING TOOLS
WEAR INSERTS
GLASS DRILLS
SPOT FACERS
TWIST DRILLS
BROACHES
END MILLS
REAMERS

**SUPER
CEMENTED CARBIDE TOOLS**

Super DENTO
Diamond Point Penetrators
Diamond Impregnated
Wheel Dressers
Special
Carbide Applications



Before

After

**Try Our Carbide Tool
Salvage Division**

A NEW AND NECESSARY SERVICE. Don't scrap your undersize, damaged or obsolete carbide tools . . . Let us restore them to new tool efficiency. Get our free estimate on:

**ALTERING . . . EXPANDING
REPAIRING . . . GRINDING
DIAMOND LAPPING**

Write for our folder on Carbide Tool Salvage.

SUPER TOOL COMPANY

21650 HOOVER RD. • DETROIT, MICH.

NEW

Improved CUT-OFF MACHINE

... AT A FRACTION OF CUSTOMARY PRICES

A powerful, accurate Abrasive Cut-Off Machine designed by Delta and built according to best engineering practice—is now available for less than half the usual price of machines of this type! That's news—good news! It can be used everywhere, in large shops or small, where material of any kind has to be cut to accurate length on a production basis. At these remarkably low price levels you can actually get two cut-off machines for the price of one—machines that can be used for scores of jobs, and quickly pay for themselves in time and money saved!

CUTS PRACTICALLY ANY MATERIAL

This new Delta unit has an unusually wide range of applications. It will cut speedily and accurately to exact lengths such materials as steel, brass, copper, cast iron, monel metal, bakelite and all plastic materials, pipe, wire rope, stellite, tool steel, manganese steel, fibrous material such as brake linings—tile, brick, carbon, porcelain, slate, hard rubber, concrete coping and sand cores. On metal it leaves the cut with a polished surface, thus eliminating many burring and finishing operations.

✓ CHECK THESE MANY FEATURES!

This improved Cut-Off Machine is ruggedly constructed with heavy castings throughout—wide spaced Timken roller pivot bearings and double arbor sealed-for-life bearings requiring no lubrication—powerful Texrope V-Belt drive—adjustable fence—accurately machined table. It is perfectly balanced, making for easy operation—cuts material at any angle and embodies unusual safety features such as husky chip guard, belt and wheel guards. Capacity up to 2 inches diameter, or material up to 2 inches by 6 inches. Shipping weight, less legs, motor, V-Belts, motor pulley or abrasive wheel, 370 pounds.



\$65.00

Model 1600 complete without legs, motor, belts, motor pulley or abrasive wheel.

DELTA Mfg. Co.

Industrial Division

632 EAST VIENNA AVENUE

MILWAUKEE, WISCONSIN

Send for
"Cut-Off"
Bulletin

giving full details
and prices on the
Delta Cut-Off Machine
and all accessories.

Delta Manufacturing Company

632 East Vienna Avenue, Milwaukee, Wis.

Please send me special bulletin on the new Delta Cut-Off Machine. ☐ Also send latest Delta Catalog of Industrial Power Tools.

Name

Address

Firm

City..... State.....

NEW PRODUCTION EQUIPMENT

(Continued from page 50)

where operations are short and many pieces are worked from one set-up. It is equally adaptable for bench work, milling, shaping, planing, drill press work and other machine shop and tool room operations. Castings are semi-steel and machined parts are accurately made. This new vise is available in five sizes ranging from four to eight inches in jaw width, is regularly supplied with hardened and ground jaws, flanged base and hand operated control valve.

Special jaws to fit any work, swivel and universal bases and foot operated valves are also available.

▼ ▼ ▼

A new Heavy Duty Magazine Feed Power Screwdriver has been placed on the market by the Detroit Power Screwdriver Company of 5373 Rohns Avenue, Detroit, Michigan.

The machine is rugged in construction; built to stand the strain of real power screwdriving. It is designed to drive cap screws and other screws in assemblies that require maximum tension.

▼ ▼ ▼

The illustration shows the machine set up to drive $\frac{3}{8}$ inch hardened cap

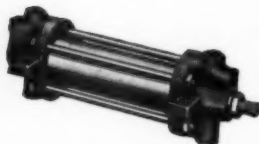
screws in ring gear assemblies. These screws are all driven to 55 foot pounds tension and the user reports a production of one ring gear assembly per minute. This is remarkably fast when considering there are ten screws to drive, in addition to the heavy assembly having to be placed in the fixture by the operator, and a lock washer placed under each screw from tray attached to fixture.

The patented barrel type hopper is individually motor driven in order to get a uniform hopper speed regardless of screwdriver spindle speed. This hopper is designed to eliminate any



1. Self-Regulating Air-Cushion eliminates shock and vibration.

2. Quick-opening Air Duct assures quick starting under full power.



There are 3 types of NOPAK Air Cylinders, (a) Self-Regulating Cushion (b) Adjustable Cushion and (c) Non-Cushioned. Each available in 8 standard mountings.

Self-Regulating Air-Cushion Wins Many Users

In industry after industry, NOPAK Air Cylinders, with the new type Self-Regulating Air Cushion, are being adopted as standard shop equipment. Quiet and quick-acting, they sell in the same price range as non-cushioned cylinders which they are replacing in many plants.

The fact that they eliminate metal-to-metal impact, reduce shock and vibration, means longer life not only for the cylinder itself... but for the equipment which it actuates. Maintenance costs are reduced to a minimum, costly delays prevented.

For further information on this NOPAK achievement—write for illustrated bulletin presenting all the latest developments in NOPAK Air Cylinders.

GALLAND-HENNING MFG. COMPANY

2757 S. 31st Street • Milwaukee, Wisconsin
Representatives in Principal Cities

NOPAK

VALVES and CYLINDERS

DESIGNED for AIR or HYDRAULIC SERVICE

A 2981-1/2



New Heavy Duty Magazine Feed Power Screwdriver announced by Detroit Power Screwdriver Co.

damage to motor or gears should foreign material get into it with the screws.

In addition to the above mentioned assembly, the machine is particularly adaptable for driving cap screws in pressure pumps, single cylinder engine heads, heavy duty valves, drain plugs, square or hex headed pipe plugs, pressure valves, and large wood screw joints.

▼ ▼ ▼

An accurate, speedy abrasive cut-off machine, built according to best engineering practices and embodying important improvements, is now available for as low as \$65—less than one half the customary cost of such machines. This new unit, just announced by the Delta Manufacturing Company of Milwaukee, will cut quickly and accurately to exact lengths such materials as steel, brass, copper, cast iron, monel metal, bakelite and all plastic materials, pipe, wire rope, stellite, tool steel, manganese steel, fibrous material such as brake linings, tile, brick, carbon, porcelain, slate, hard rubber, concrete coping and sand cores. On metal it leaves the cut with a polished surface, thus eliminating many burring and finishing operations necessary where other cut-off methods are used. By switching to a saw blade this same unit can be used for cutting wood.

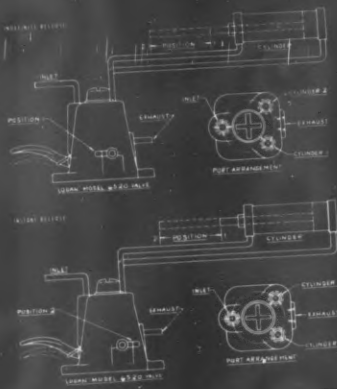
Some of the outstanding features of this rugged machine are: wide-spaced Timken roller pivot bearings and dou-

(Continued on Page 60)

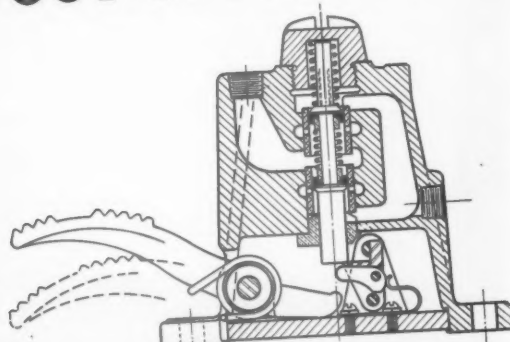
A NEW DUAL PURPOSE AIR CONTROL VALVE

CONVERTABLE TO INSTANT OR INDEFINITE RELEASE TYPES

"Logan" Engineers realized the necessity of developing a Dual Purpose, Foot Operated, Four Way Control Valve and now present to you the Model 6520 valve. This type valve gives instant or indefinite release control over cylinders. A convenient latch lever on the valve side is operated from one position to the other for changing the valve functions. This type valve permits standardization of valve equipment in your plants. Adopt this type valve for your needs and benefit by the outstanding design features offered: Simplicity of construction, ease of operation, long life, and trouble free service. Valve is self cleaning, moulded cup packings are self sealing and all parts are corrosion resistant. Write for complete information.



**MODEL 6520
FOOT OPERATED**



Patent Pending

"LOGAN"

LOGANSPORT MACHINE, INCORPORATED
902 Payson Road LOGANSPORT, IND.
 Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders,
 Valves, Presses and Accessories

LOOKING AROUND

By Perry Scope

Designing comfortable tools is the subject I promised to discuss this month. Now whoever heard of a comfortable tool? Just what is a comfortable tool? To answer that we should define the adjective itself. Just the thought of something comfortable brings a sense

of relief from worry, a soothing satisfaction, a sense of perfection having been attained.

The other day I saw a paring knife that had a handle on it that fit so perfectly in the clasped hand that it just "sort of" belonged—it was comfortable there. Furthermore, the cutting edge was straight to the tip and not curved as is every other paring knife I ever saw, and was also double bevel ground and of stainless steel that really holds an edge. Now fellows, there is a tool that meets its every requirement perfectly. Nothing was overlooked. That is what I call a comfortable tool.

"That which is comfortable gives entire satisfaction," so says one lexicog-

rapher—and brother, when you start designing a tool to give entire satisfaction, you have tackled a job.

Now then, since your profession demands such all inclusive results, it would seem that the logical starting point would be with your own preparation. You should be informed as to the latest developments in your industry and its tooling art; you should be a consistent reader of several pertinent publications involving problems within your industry's field and you should read each issue selectively.

Start at the cover and look through the ads until you come to the table of contents. Skip that. Start through page after page glancing at headings, sub-headings, pictures, and drawings. You will find yourself getting far more out of that issue than if you rely upon the Table of Contents to select your reading. You should read the late copies of "Patents Issued." If your firm doesn't subscribe, ask them to do so and until they do, go to the library. Now don't expect to find it packed with new ideas, for even that sheet is disappointing from that standpoint. Rare indeed is a real invention; there is really very little new under the sun. But it is chock-full of new applications of old ideas. Therein lies one of the weaknesses of our patent laws. If you think you really have a new idea, a real invention, try to get a patent on it in Germany. If you succeed, man, you really have something! But a patent in this country can be obtained on almost any new application. Even I have a few patents.

However, this idea of finding new ways of doing the old is more fun anyway—and something we can all do if we but try. When a need is presented to me, I like to sit down and note how many ways I can think up to do the job. It really is a lot of fun and good mental gymnastics too. Then, from those ideas, I try to select the most comfortable method and tools for the task.

There's that word again—comfortable. First of all, I want to do the job the easiest and yet the most thorough way. So I refer to my "Alphabet for Tool Engineers" (see previous issue of The Tool Engineer) which has about 150 factors for properly engineering the average tooling problem. This is purely a reminder chart so that I can systematically cover the salient points, as I move toward my objective with no fear of oversight and less fear of error. And believe me fellows, and I can't stress this too strongly, you should prepare a set of at least 100 factors for your own use, in your own company, in your own language. If you will do this and use it, you will get more comfort out of your work; in fact, your work will give more comfort to everyone concerned. Furthermore, you'll learn what is meant by a comfortable tool.

Well here I am at the end of my allotted space, so I'll continue in the next issue.

P.S.: God help those who don't help themselves.

a Salesman's tip —

Dear Bill:
You win your bet. Rejection complaints are way down.

I had no idea that performing the initial key operation by broaching would improve accuracy of the whole machining sequence to such an extent. Imagine you must be the fair-haired boy with the old man since those Colonials went into the heads of the odd-lot production lines. The way parts are coming through now makes it a lot easier to get repeat orders.

By the way, here is a tip for you. In calling on various shops around this section, I have been running into a sweet little machine that sells for less than \$500.

It's an hydraulic press called the Colonial 'Junior'. They seem to use it for just about everything: light broaching, pressing in bushings, assembling needle bearings, etc. I understand it comes in 1/4, 1/2, and one ton capacities with 9 or 12 inch strokes.

You can stick it just about anywhere apparently: on a bench or pedestal, or on top of larger machine tool beds as auxiliary presses.

If you don't know all about it, why don't you drop Colonial a line?

Yours,
Jack

— about Broaching

COLONIAL BROACH COMPANY

147 JOS. CAMPAU
DETROIT, MICHIGAN

COLONIAL BROACH CO., 147 Jos. Campau, Detroit.

Please put me on your mailing list for "BROACHING NEWS"

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FEDERAL



It Has Everything

From contact point to pointer, every detail of a Federal Dial Indicator has a very definite reason for the way it is constructed. New materials are constantly tested to determine if there is something better. New manufacturing methods are developed to improve the fidelity, sensitivity and accuracy of the instrument. At the right, the basic features which make Federal Indicators out-sell all others are listed. For design construction and service you receive the most from FEDERAL.

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1144 Eddy St. Providence, R. I.

Movement—Complete Unit

Permits better alignment of rack and gears resulting in better accuracy and action.

Case a Solid Piece

No screwed or soldered pieces to become loose or out of line, but a *solid* brass case and stem.

Bearings Low in Friction

Federal was first to use jewel bearings. First to establish value of Full-Jewel Low Friction Indicators. Rack bearings also self-lubricated to give lowest possible friction.

Accurate Gear Teeth

All gears cut in our plant where tooth form can be rigidly controlled for greater accuracy.

Precision Assembly

Exceptional means is provided for accurate assembly. No watch is more carefully put together.

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Mention "The Tool Engineer" to advertisers

THE TOOL ENGINEER FOR MARCH, 1940

PRODUCTION PERSPECTIVES

(Continued from Page 48)

per cent in iron and steel products mills, the aggregate amount paid by these concerns rising from \$1,119,189 in January last year to \$1,680,791 in January this year.

Skilled mechanics still are in demand in the labor market, it is reported by manufacturers' representatives with New England now being looked to by the metal trades elsewhere to supply necessary help. It is questionable, though, according to those in the labor field, as to how many mechanics actually are leaving Springfield and vi-

cinity for other places. A goodly number have taken employment at the United Aircraft Corporation factory in East Hartford—some predictions are that as many as 1,000 Western Massachusetts residents now are employed there—but it is considered unlikely that many are going much farther afield.

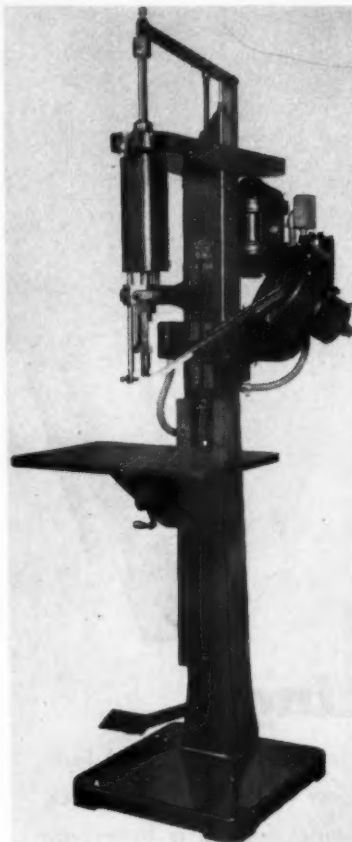
War department orders for munitions and machinery connected with manufacture of munitions amounting to more than \$1,141,000 have been placed with industrial firms in the Hartford Ordnance District, which has headquarters in Springfield. The biggest went to the Bridgeport Brass Company for 640,000 cartridge cases for 75 mm. guns at a

cost of \$716,800. The Greenfield Tap & Die Corporation, Greenfield, received orders for gauges totaling more than \$8,000.

At a stockholders' meeting held January 12, 1940, W. Beltran duMont was named Vice President and Director of the Threadwell Tap & Die Company, Greenfield, Mass., in an expansion program. Mr. duMont, formerly Vice President in charge of sales of the Greenfield Tap & Die Corporation, brings to Threadwell 27 years of experience in the small tool business.

Other new Directors elected are Philip Rogers, President of the Millers Falls Company, and George C. Lunt, Treasurer of the Rogers, Lunt and Bowen Company.

New HEAVY DUTY model C MAGAZINE FEED Power Screw- driver



A rugged production machine built to handle tough assembly jobs.

Drives cap screws up to 60 foot pounds tension.

Capacity from $\frac{1}{4}$ " to $\frac{5}{8}$ " cap screws up to $2\frac{1}{4}$ " long. Also standard machine screws, wood screws, hex or square headed pipe plugs, and special screws.

We also manufacture hopper feed screwdrivers for screws ranging from No. 4 to $\frac{1}{4}$ " diameters; also motor driven hoppers for feeding screws, screw blanks, pins, rivets, nuts, flat washers, and other small parts.

Write for information. Send samples for production estimates.

DETROIT POWER SCREWDRIVER CO.

5373 Rohns Avenue

Detroit, Michigan

MACHINES AND TOOL ENGINEERS

(Continued from Page 42)

With Europe engaged in a war which may threaten our economic and social ideology, and with our own country striving to recover lost ground on the road to a higher standard of living, ours is an obligation . . . an obligation to demonstrate that enlightened self-management of industry, commerce and agriculture is the only way to bring the greatest enjoyment of goods and services to the greatest number of people.

CUTTING FLUIDS

(Continued from Page 17)

Plain water or water containing an alkali such as borax makes a very satisfactory cutting fluid where cooling and washing away chips are required, as in grinding, drilling, sawing, light milling, or turning. The fluid is inexpensive, but does not prevent the formation of rust on the machine and work if carelessly used.

To Hold Lectures on Fundamentals of Foundry Practices

The Detroit Chapter of the American Foundrymen's Association will present a series of six lectures on "Fundamentals of Foundry Practices," starting on March 1 and continuing each Friday thereafter, in the Chemistry Lecture Room at the University of Detroit, Livernois and McNichols Road, Detroit, Mich.

The lecturers will be such prominent men in the foundry field as: H. W. Dietert, of H. W. Dietert Company; V. A. Crosby, of Climax Molybdenum Company; Fred Weaver, of Great Lakes Foundry Sand Company; L. G. Korte, of Atlas Foundry; Donald J. Reese, of the Development and Research Division of The International Nickel Company, Inc.; John A. Linabury, of Saginaw Malleable Company; and Omer Allen, of Pontiac Motor.

The course has been arranged by the Educational Committee of the Detroit Chapter composed of the following: F. J. Walls, of International Nickel, who is chairman of the committee; A. L. Boegehold, of General Motors Research; Fred Melmoth, of Detroit Steel Castings; A. J. Herzog, of Climax Molybdenum; A. Di Giulio, of University of Detroit; E. K. Smith, of Electro-Met; R. E. Schneidewind, of the University of Michigan; and A. H. Allen, of The Foundry.

Registration fees will be \$1.50 for members whose companies are members of the A.F.A., and \$2.50 for non-members.

18 DIFFERENT BORING AND TURNING JOBS-- DONE WITH ONLY ONE SET OF WETMORE TOOLS

--TIME AND MONEY SAVED FOR LARGE IMPLEMENT MANUFACTURER

These Features
Made This
Performance
Possible:

—adjustments made faster than on any other tools used in this plant which means dollars saved in set-up time and increases productive time of operator.

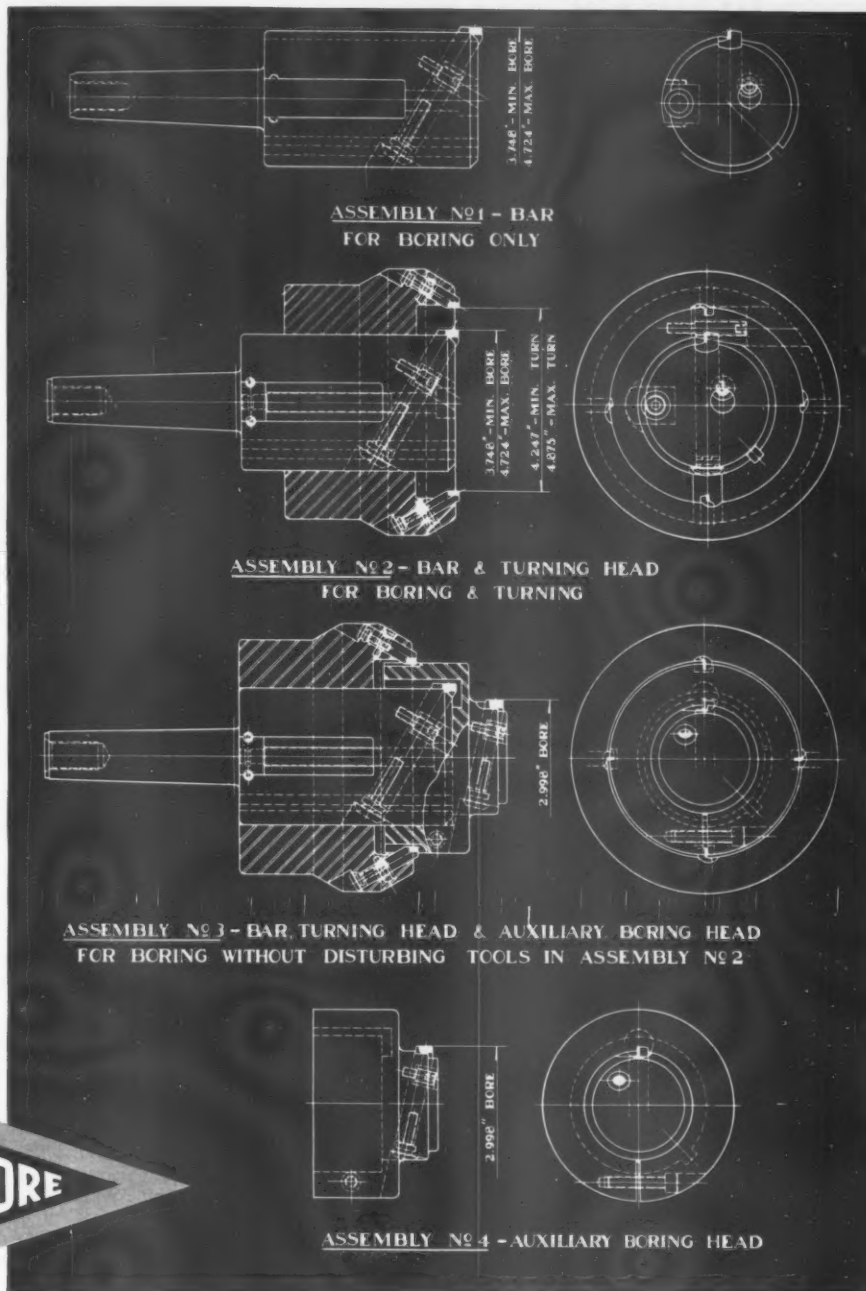
—extremely accurate adjustment made by means of adjusting screw; Wetmore patented wedge-lock holds cutting tools rigidly and solidly.

—tools illustrated bore and turn 18 different jobs:

Assembly No. 1—used for boring on 5 jobs.

Assembly No. 2—used for boring and turning 9 jobs.

Assembly No. 3—used for boring 4 jobs.



Send in your drawings—Wetmore engineers will design tools to reduce tool-setting time and cost per piece machined. See your Wetmore representative for many other surprising applications.

WETMORE REAMER COMPANY

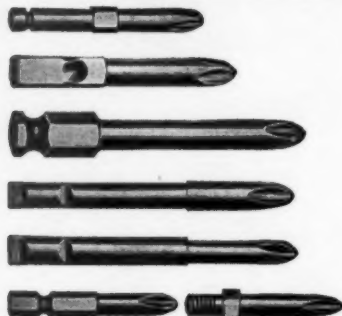
Dept. TL 420 North 27th Street

Milwaukee, Wisconsin

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POWER BITS

for Phillips Recessed Head Screws



Apex-Phillips Power Bits are economy tools—*economical* per thousand screws driven; *economical* because they can be re-conditioned, as new, time after time at a moderate cost.

Apex-Phillips Power Bits are made of a special shock-resisting steel, heat-treated to give maximum hardness, toughness and wear resistance. Special bits are made for case-hardened, self-tapping screws. Apex Power Bits are made for all types and sizes of electric, air and spiral drivers.

APEX POWER BITS

for Slotted Head Screws

Are of the same quality of long-wearing, tough, shock-resisting steel. For all types of electric, air and spiral drivers, for screw sizes from No. 4 to No. 18.

Send today for your copy of the APEX Manual and Catalog No. 11. Free, of course.

APEX PRODUCTION TOOLS

Stud Setters . . . Universal Joints . . . Tension Wrenches . . . Plain Socket Wrenches . . . Parallel Floating Tool Holders . . . Universal Floating Tool Holders . . . Universal Joint Socket Wrenches . . . Positive Drive Chucks and Collets . . . Quick Change Drill Chucks and Collets . . . Friction Drilling and Tapping Shucks and Collets . . . Friction and Positive Vertical Float Tapping Shucks and Collets.

The
**APEX MACHINE & TOOL
Company**

503 E. Third St. Dayton, Ohio

HOW DO WE GET IDEAS?

BY ARNOLD THOMPSON

CHAIRMAN ONTARIO, CHAPTER A.S.T.E.

THE USUAL answer is, by study and research. This however, is not enough for the Tool Engineer. His ideas come to him without apparent effort, usually from long experience and many trials and errors, but they seem to come spontaneously, without much conscious effort and when least expected. They suddenly appear from nowhere in particular and for no apparent reason. Is there any method by which ideas can be induced? What training is necessary? Have ideas any specific place of abode where we may find them?

It seems to me that ideas are not haphazard impulses floating through the ether for any brain to pick up, but are in the actual article under consideration. Life is not understandable by us outside of something living. Science has not discovered what life is, and I contend that ideas cannot be disassociated from matter. We cannot think abstractly, we must have an object to think about, and we can only see in that object the things we have knowledge of. Our knowledges are stored in the subconscious mind to be awakened at some future time by association with some object, and when analytically and rationally considered, may bring forth a new idea. Knowledges are easy of acquisition, but intelligence to use them must be developed.

A piece of paper with three dots is exhibited for your consideration. Apply all your knowledges, analytically and rationally, and what does your mind bring forth? Each will visualize different things according to his knowledges and desires. The child sees just a piece of paper with dots on it, others, the color of the paper, of what pigment the dots are made, the size of the paper, the quality of the paper, what it is made from, how made, the machines that made it, the men that worked the machinery, the type of men, what they eat, where they live, the flax or trees from which the paper was made, the chemistry involved, the origin of matter back to the beginning, the anticipated results of the burning of the paper, the forming of gases to go through the same cycle and at some future time be a part of a similar sheet of paper, containing all the knowledges from the beginning for the benefit of that race of engineers, to bring forth some further use to mankind.

If you consider any other object, another sequence will unfold, again you will cover all things from the beginning. It is a long winding trail, however, from dots on paper to "Superfinish," for there is no particular objective, and by this method very few new ideas emerge for the future use of the human race. How can ideas be induced?

There are many examples in tool engineering to demonstrate the method, mostly, it is to "ask why?" and find how: why did bearings "false brinell" in freight transit? How can we stop it? Why the roughness of broken glass, scratching surfaces? Why the smoothness of plate glass? Why did the smooth surface of the toolmakers' lapping art wear longer? and from these and other why's an analytical mind, a series of trials and errors (or rational experiments) brought forth "Superfinishing."

Now, you Tool Engineers, take any job you have in hand and ask the "why" of everything about the job; why the centres of lathes and the work, why the speed, why the feed, why the angle of cut, and why and why and why. If you do not know all the "why's" then search the knowledges that the world is so full of and apply them intelligently and see how many ideas come to you that you had not been conscious of before.

Some idea, selfish man desires to reap a benefit from, as an invention, whereas nearly all inventions are the accumulated ideas of numerous men. Tool Engineers are among the greatest collectors of ideas, and reap the least personal benefit from them. It is well it is so, because ideas usually come of necessity and not of affluence.

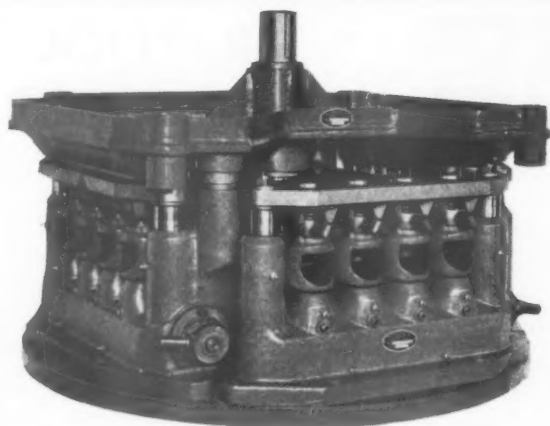
As mentioned before, all knowledges are stored in the
(Continued on Page 68)



This photograph shows the new series of Niagara High Production Power Squaring Shears just added to the complete line. This series is built in capacities from 10 gage to $\frac{1}{2}$ inch.

More working strokes per hour are the result of convenient arrangement for handling sheets . . . accessible control . . . instant acting 14-point engagement sleeve clutch with built-in

single stroke mechanism . . . new self-measuring, ball-bearing, parallel back gage providing quick operation and micrometer accuracy. Write for Bulletins. NIAGARA MACHINE & TOOL WORKS, General Offices and Factory, 637-697 Northland Ave., Buffalo, N. Y. Branches: New York, Cleveland, Detroit.



CLAMPING ECONOMY WITH SWARTZ LOCKS

Proposal L2074

Showing four station index fixture—load, drill, redrill, and ream—rocker arms. One lever motion clamps four parts through equalizers. Locating prongs act as chip breakers.

CONSULT OUR ENGINEERING DEPARTMENT FOR SUGGESTIONS

SWARTZ TOOL PRODUCTS CO., INC.

5259 Western Avenue

ASK FOR CATALOG 238B

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Indianapolis—J. W. Mull, Jr.
Milwaukee—Geo. M. Wolff, Inc.
Tulsa, Okla.—Brammer Machine
& Tool Service Co., Inc.

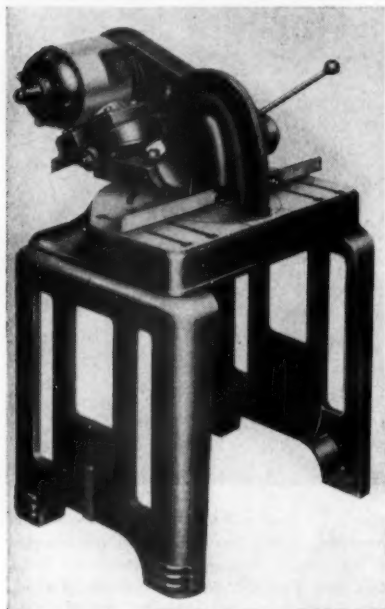
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Canada—Hi-Speed Tools, Ltd., Galt, Ont.
St. Louis—Mill Supply & Mach. Co.

Onelda, N. Y.—W. F. Himmelsbach
Pittsburgh—J. W. Mull, Jr.
Toledo—J. W. Mull, Jr.
Philadelphia, Pa.—Morgan Tool
& Equipment Co.

NEW PRODUCTION EQUIPMENT

(Continued from Page 52)

ble arbor sealed-for-life bearings requiring no lubrication—powerful Tex-Rope V-Belt drive—adjustable fence—accurately machined table. It is perfectly



New low-cost abrasive cut-off machine introduced by the Delta Manufacturing Company.

balanced, making for easy operation—cuts material at any angle and embodies unusual safety features such as husky chip guard, belt and wheel guards. It has a capacity up to 2 inches diameter, or material up to 2 by 6 inches.

This machine can be used in large and small factories and because of its remarkably low cost should find a wide range of applications in many industries.

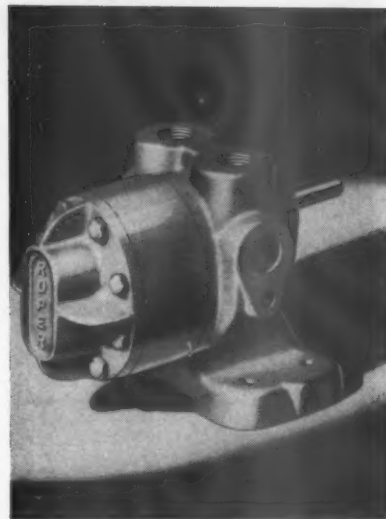
▼ ▼ ▼

A new line of Roper Rotary Pumps has just been announced by the Geo. D. Roper Corporation.

Containing over 7,000 different units this new line includes pumps of 1 to 1000 g.p.m. capacities at speeds up to 1800 r.p.m. and against pressures up to 1000 lbs. per square inch. At present 21 different drives and mountings are available ranging from ordinary foot, hub and flange mounting heads to complete bedplate units for direct motor drive; gear reduction; flat or V-belt drive.

A feature of the new line is "hydraulic balance." It equalizes internal pressure at all points and absorbs all shock or thrust from power end of drive shaft, it is claimed.

Other features include a choice of spiral, spur or herringbone gears; conventional packing box, spring loaded packing box or mechanical seal; sleeve or roller bearings; built-in or external



New Roper Rotary Pump line featuring "hydraulic balance" which equalizes internal pressure at all points and absorbs all shock or thrust from power end of drive shaft, it is claimed.

relief valve; eight different piping arrangements.

Write to Geo. D. Roper Corporation, Rockford, Illinois, introducing "The Tool Engineer," for full information.

▼ ▼ ▼

The Ross Operating Valve Company, Detroit, announces a new special model, solenoid operated air valve—Model 192,

(Continued on Page 62)

RACINE

VARIABLE VOLUME HYDRAULIC PUMPS

Tool Engineers and designers, you are offered a complete service for oil hydraulic systems. Variable volume pumps—Feed controls—Pressure regulators—manual and mechanical type valves. Let Racine assist you with your hydraulic problems.

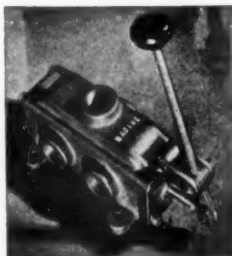


Extremely quiet, smooth performance. A thoroughly proven efficient pump for pressures up to 1000 lbs. per square inch. Capacities 2000-4000-6000 cubic inches per minute. The Variable Volume feature saves horse-power. Delivers amount of oil actually required. Volume is controlled automatically or manually.

RACINE HYDRAULIC VALVES

A complete line—manual—pilot or electrically operated. Balanced pistons—accurately fitted. For oil-hydraulic installations.

Write for catalog V-10



Write for catalog P-10

RACINE TOOL AND MACHINE CO.
1777 STATE ST. RACINE, WIS.

MR. TOOL ENGINEER-

When you have that job tooled up for High Production, will its present coolant system handle the job? Will you need a greater, more dependable volume? Or will you need a pump that will not be injured by abrasive carrying liquids? A Gusher Pump will solve your problem.

Gusher COOLANT PUMPS

Wherever metal is cut under stress by tools or abrasives—where efficient operation depends on a steady, easily controlled supply of coolant, use Gusher Coolant Pumps.

Tell us your coolant requirements. We will be glad to suggest the proper pump and send engineering data sheets.



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RUTHMAN MACHINERY CO.

542 E. Front St.
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DEMANDS FOR PRECISION HIT NEW HIGH!



● There's a big boom going on now in precision manufacture. Manufacturers have to regage to new limits to meet today's demands. Many new orders call for greater accuracy than ever before. If you want to cut into these new orders—and maintain your new precision limits—GET JOHANSSON GAGES NOW.

Unexcelled for accuracy. Limits to WITHIN $\pm .000008$ inch, $\pm .000004$ inch, $\pm .000002$ inch. Sold separately or in sets.

Most Johansson Blocks Available Chrome-plated

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Johansson Gage Blocks. Booth No. 1. Industrial Tools and Equipment Exhibition, Bridgeport, Conn., March 6-9, 1940

**JOHANSSON
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Dearborn, Michigan

Please send me free Catalog No. 14.

Name

Address

City State

**MARVEL
NO. 8
Metal-
Cutting
BAND
SAW**



Universal $1\frac{1}{8}$ x $1\frac{1}{8}$ or 18" x 18"

straight cuts or angle cuts . . . any degree right or left
handles large work and small work with equal facility

MARVEL No. 8 The universal Metal Band Saw that will handle **any job**—the lightest, most delicate work as well as extremely large and heavy work up to 18" x 18". Work is always held stationary on the bed, and blade feeds into work at any angle to 45° right or left.

With a Marvel No. 8 you can turn "warehouse cutting extras" into **extra profits**—can avoid delays, can save expensive machine hours roughing-out, can do notching, blocking and coping work more easily and economically.

Extremely accurate and flexible with hand or power feed, the No. 8 is the busiest machine in most shops and tool rooms. The new model is heavier, with moving parts fully protected . . . and faster.

Write for Bulletin No. 800



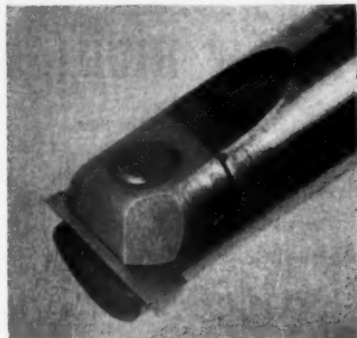
ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5750 Bloomingdale Ave.

CHICAGO, U.S.A.

Eastern Sales Office: 199 Lafayette St., New York



The new EVEREDE BORING BAR is the only bar on the market having the economical triangular bit. The design of this boring bar permits the use of a larger diameter than formerly used, due to having the bit cut in front, making room for the bar. This design spells rigidity, making higher boring speeds and heavier cuts possible.

The EVEREDE BORING BARS are made of the finest heat treated nickel steel; and each bar comes equipped with six high speed steel triangular bits. In addition, this is the only boring bar that allows the use of a solid Stellite or carbide tool bit. This is accomplished by clamping the bit on the "V" type grip, which holds it firmly without danger of breakage.

Send for descriptive folder.

EVEREDE TOOL CO.

Willis Slutson

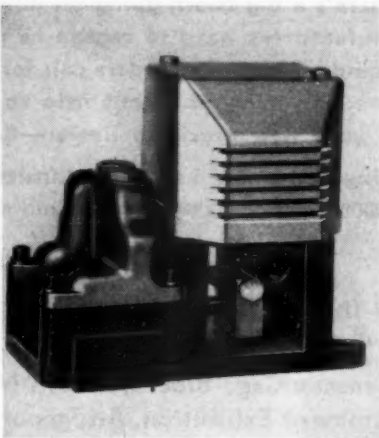
184 N. WACKER DRIVE, CHICAGO

Representatives in principal cities

NEW PRODUCTION EQUIPMENT

(Continued from Page 60)

Special—which was built to meet manufacturers' demands for high speed operation of welding guns. Although it is



New Ross valve designed to meet high speed operation demands on welding guns—as many as 400 welds per minute being claimed by the maker.

claimed that this new Ross valve has operated at considerably higher speeds on experimental work, it is now regularly delivering 400 welds a minute on production jobs. This, we are told, is several times faster than has ever before been accomplished and makes pos-

sible new production records for manufacturers using this type of equipment.

▼ ▼ ▼

A novel use for a hydraulic broaching machine was developed recently by Colonial Broach Company, Detroit, for a prominent motor car manufacturer. It was desired to test, in production, the strength of a steel hub core and spoke castings for steering wheels, "straightening" the spokes at the same time.

For the operation, a standard Open Side Utility Broaching machine was selected. The machine is completely hydraulic and automatic in operation and is provided with a vertically adjustable fixture table. The steel steering wheel core and spoke casting is merely laid in the fixture, the ends of the spokes being supported right and left, while the hub at the center is also supported on hardened steel plates.

Starting the machine causes the fixture slide to shuttle back into the fixture automatically. The ram then moves downward. Two notched bars carried from the ram cross-head bear against the spokes, midway between their ends and the hub, thereby bending the spokes. When the limit of the desired travel has been reached, automatic stops trip an operating valve, and the return stroke of the ram causes the spokes to be bent back into the correct position.

(Continued on Page 66)

BETTER TOOLS MAKE BETTER PROFITS!

IS IT TIME TO RE-TOOL IN YOUR PLANT?

OLD equipment and up-to-date competition make hectic partners! The kind of set-up you have can spell the difference between getting a contract **at a profit**, and just getting a contract.

O K Inserted-Blade Metal Cutting Tools promote economy and speed because only the blades, or bits, are made of cutting steel, and because of the wide variety of bit styles always available.

O K Single-Point Tools embody various locking designs. In some, the bits are held in mated serrations, in others round-shank bits are locked in a drop seat; in others the locking devices are still different. In O K Multiple Cutters, the blades are driven into serrated mating slots in the body. There they lock automatically and positively, without wedges, pins or set screws—yet are instantly adjustable in line of wear.

O K Catalog Sent on Request

This catalog includes milling cutters, end mills, face mills, boring heads, reamers, multiple operation set-ups, and single-point tools for lathes, shapers, planers, etc. Everything is here for your complete re-equipment—or, a machine or department at a time may be revised. On this, our engineering department will be glad to cooperate.

THE O K TOOL COMPANY, SHELTON, CONN., U.S.A.



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FLOATING TOOLHOLDER

*Corrects Machine Tool Misalignment By
Producing TRUE and ACCURATE Holes*



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FLOATING
HOLDERS
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TAP CHUCKS
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ADJUSTABLE
ADAPTERS

ADJUSTABLE
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WOODRUFF CUTTERS
CORE DRILLS

THE J. C. GLENZER CO.

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PRODUCTION

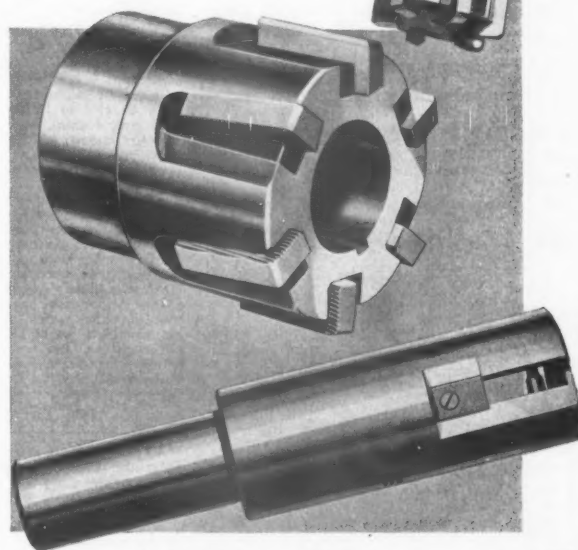
Tools

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THROUGHOUT THE
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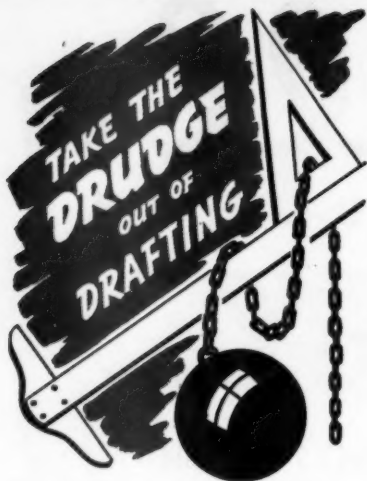
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NEW LITERATURE

Of Interest to the Tool Engineer
 (Continued from Page 44)

Brown & Sharpe have issued a new twenty page booklet entitled "Brown & Sharpe Universals—for a Wide Variety of Tool Room and Production Grinding." Large attractive illustrations including many close-ups of various features of the B. & S. Grinding Machines make the piece interesting as well as easy to read. For your copy address Brown & Sharpe Manufacturing Company, Providence, R.I.

▼ ▼ ▼
 The complete line of Peerless Automatic Metal Sawing Machines is displayed for the first time in Peerless Bulletin 50. It is strikingly different in design from most sales bulletins hitherto issued in this field.

All machines are shown in large pictures. Precise illustrated information is included on the important new or ex-
 (Continued on page 66)

Industrial Relations Committee A.S.T.E. PERSONAL SERVICE FOR MEMBERS

SITUATIONS AVAILABLE

Detroit manufacturing company has opening for die designers on sheet metal and die casting dies, gages and instruments. Applicants must have had board experience and tool and die making experience.

Engineering company in Rock Island, Illinois requires several tool engineers experienced on tools, dies and fixtures for a program of approximately five months.

Printing machinery company in Pittsburgh, Pennsylvania has opening in engineering department for experienced designer of jigs, fixtures and tools.

Tool engineers required for work in Rochester, New York. For further information call Tyler 5-0145 or write to American Society of Tool Engineers, 2567 West Grand Boulevard, Detroit, Michigan.

SITUATIONS WANTED

Designer with many years experience seeking a position as tool designer or tool room foreman with small manufacturing company in a small town or city in Michigan or northern Indiana. Also has capital for investment and interested in purchasing tool and die shop located in same area.

Experienced tool designer available for work in Indiana, Michigan, Illinois, or Ohio.

Gear engineer experienced in design of gear cutting and inspection fixtures, design of gears and transmission parts, operation of gear cutting machines and gear laboratory equipment, available for work as gear engineer, or designing and production engineer.

Man with many years experience as chief engineer and some experience as sales engineer available for sales engineering work or employment as production manager or plant superintendent. For further information call Tyler 5-0145 or write to American Society of Tool Engineers, 2567 West Grand Blvd., Detroit, Mich.

CLASSIFIED ADVERTISEMENTS

WANTED—Young man with outstanding personality and proven sales ability to push line of socket screw products and metal belt fasteners. Highest character references required. Work will include calling on designing engineers and purchasing agents of organizations manufacturing machinery and machine tool specialties, conveyor equipment, also mill supply jobbers and miscellaneous trade outlets and will be judged strictly on basis of actual sales obtained. Candidates must be free for constructive traveling campaigns in Eastern States. Write stating age, education, background of experience, salary desired and other reasons for desiring to be a salesman. Box 708—THE TOOL ENGINEER.

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HEAVY-DUTY MICROMETERS

Here's the ideal "Mike" for your production work. You can give it plenty of hard use and need never doubt its accuracy. The frame is extra sturdy though comparatively light weight and the action is smooth as velvet.

The Lufkin system of markings gives accurate, positive readings at a glance. Exclusive adjustment features permanently preserve the tool's original accuracy.

Made in sizes from 1 to 12".
 Send for catalog No. 7.

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Any Heat-Treated Alloy Steel Screw!

Where else can you obtain 16 different kinds of heat-treated, alloy screws—all standard? Or any other type made to your specifications, and with Mac-it's quarter century of experience in making top quality products?

Plenty of buyers are making their jobs easier, getting better results, by standardizing on Mac-its. They're the only complete line of heat-treated alloy steel screws on the market. And they're good!

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THE STRONG, CARLISLE & HAMMOND COMPANY
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SICK TOOL CRIBS RESPOND TO "ROTABIN" TREATMENT

**If Your Tool or Stock
Circulation is Sluggish
--consult "ROTABIN"
Specialists.**

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Built for hard, tough work—die cannot lose alignment with punch—all parts interchangeable.

Capacity $\frac{1}{2}$ " holes through $\frac{3}{16}$ " steel; $\frac{11}{16}$ " through $\frac{1}{4}$ " steel. Can also be made for holes up to $\frac{7}{8}$ " in thinner metal. Stock punches and dies available from $\frac{1}{16}$ " to $\frac{1}{2}$ " by 64ths.

Weight, 70 lbs.

PRICE WITH ONE
PUNCH AND ONE
DIE—

\$37.00

Immediate
Shipment

**T. H. LEWTHWAITE
MACHINE CO.**

(Est. 1890)

307 E. 47 St.

NEW YORK

NEW PRODUCTION EQUIPMENT

(Continued from Page 62)

Both downward and upward strokes of the ram are adjustable by means of screw threads and nuts, the adjustment for the down stroke being at the top of the ram cross-bar shown in the illustration, while that for the upstroke is below the table.

The machine has a capacity of four tons and an 18 inch maximum stroke length. Actually only about 2 inches of stroke are used for the specific operation, however. With the set-up some 300 steering gear spoke assemblies can be tested and straightened per hour.

The use of a hydraulic machine of this type of course insures smooth operation and eliminates sharp shocks to the casting.

NEW LITERATURE

(Continued from Page 64)

clusive features of design contributing to the unusual performance of these production machines, and the special equipment available for them.

Note particularly should be made of the illustrated "footnotes" on several pages showing various kinds of work met with in this field.

The company will be glad to send copies of this bulletin to any "Tool Engineer" readers who may desire them. Address Peerless Machine Company, Dept. T-E., Racine, Wisconsin.

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A 60,000 R.P.M. Unit Weighing $2\frac{1}{4}$ pounds
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Special Grease Sealed Bearings
No Lubrication Required

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Automatic Air Line Lubricators
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In Connection
with other
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ENGINEERING SERVICE

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Made in three sizes
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swing) the SHELDON Lathe
is just the lathe for your
experimental department, repair de-
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ideally suited for the manufacturing
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in many styles and combinations.
No. 1136 WFCQ—11" Swing, 36" be-
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Large, hardened steel spindles, and
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SHELDON LATHES,
though low in price,
are quality machine
tools in every de-
tail . . . in design,
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ship and in features.

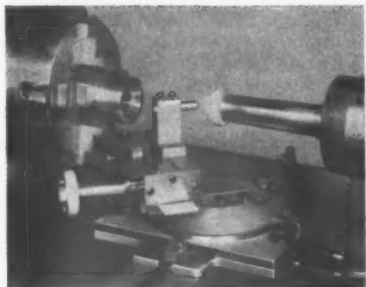
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can say
is that
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**STA-KOOL—Dissipates Heat
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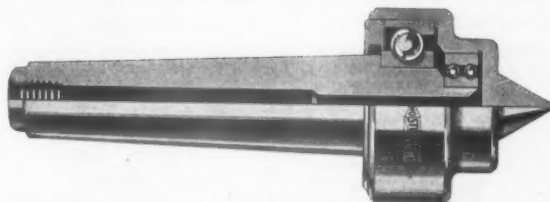
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To use any ARMSTRONG TOOL HOLDER is to "Save: All Forging, 70% Grinding and 90% High Speed Steel" . . . to use the right ARMSTRONG TOOL HOLDER is to be really efficient. In the Armstrong System are more than 100 tool holders, sizes and shapes correctly designed and proportioned for each lathe, planer, slotter and shaper operation. While each is a permanent multi-purpose tool that will do the work of a complete set of forged tools, it is not true efficiency to use one tool holder for which another tool holder was designed. For example, the ARMSTRONG TURNING TOOLS which hold their cutters at the most efficient angle for turning, is frequently seen doubling on a shaper. While this tool will give a very creditable performance it is not as efficient for this work as the ARMSTRONG SHAPER TOOL which is specifically designed for this work—that holds cutters at the correct "shaper" angle, holds its cutter in any of 10 positions permitting a much more convenient approach to the work, or can be reversed to make a "goose-neck" tool if desired. It is to the credit of American workmen that they usually have sufficient ingenuity to get along with the tools at hand, but it is better business and better shop practice to use the right ARMSTRONG TOOL HOLDER on each operation. Authorize your foreman to requisition these tool holders as needed. They can be bought from stock at all leading Mill Supply Houses.



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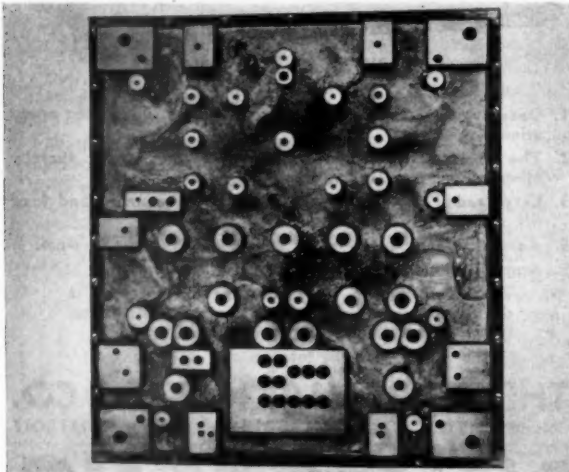
The bushings in the perforating die for the Hickok Electrical Instrument Co. were secured with 10 lbs. of Cerromatrix. 2 days were saved in die-making time. This is one of the many money-saving applications described in our new Cerromatrix Manual.

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HOW DO WE GET IDEAS?

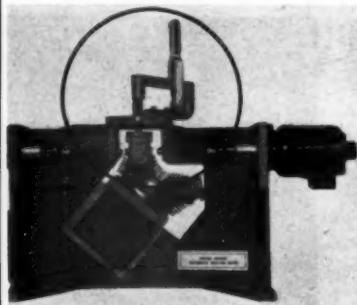
(Continued from Page 58)

sub-conscious mind, and must be transferred to the conscious mind for our recognition. The sub-conscious mind also governs our respiration, heart beats, and digestion, etc., so that if we overload the subconscious functions of the body then we have difficulty in recalling knowledges and correlating them. This is why ideas come in periods of quietness and repose and when least expected, so gather all your knowledges of your immediate problem and in quiet contemplation the answer invariably comes, and you will usually find that the most complicated process eventually resolves itself into a simple solution that anyone should have thought of. So, let this be a guide, if an idea is simple, it is usually correct and effective; if complicated, it is usually wrong.

TURNING BACK THE PAGES

March, 1935, issue—five years ago . . . the past thirty days would seem to indicate that depression days are over . . . this is evident in the Detroit area particularly where payrolls are larger . . . most shops working overtime . . . Carboloy reports the biggest January with a 125% increase over January a year ago . . . Swan Bergstrom on vacation in Mexico . . . Ed. Harper in Florida . . . Ray Farmer taking time out from his Cadillac Motor Company duties to be elected president of the Auto City Racing Association . . . O. B. Jones as busy as "old times" . . . A. G. McMann dies, for seventeen years at Ford Motor. . . .

March, 1939 issue—one year ago . . . A special pre-view dinner and showing of the Machine & Tool Progress Exhibition will be held the 13th of this month . . . Legislators, outstanding clergymen, the nation's most prominent industrialists, educators and others have been invited. Franklin Aircooled Engines are to be manufactured again—this time by the Aircooled Motors Company of Syracuse. . . .



Application shows type BFB used
on special drill fixture.

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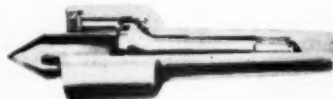
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**For Lathes, Hand Screw Ma-
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1. Simplicity and sturdiness adapt this center to heavy duty with extra long life.
2. Sufficient bearings for radial, thrust, and alignment loads resulting in 50% more radial load than the average live center.
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A lower first and last cost. Let us prove it by sending you one today for a ten day trial, and if not satisfactory in every way return it.

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**Deliver a Known
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Haskins Type C Tapper with Built-In Air Control

Complete Air Control of down stroke, return stroke and dwell at top of stroke. Machine operates in continuous cycles as long as foot pedal is depressed, or is easily adjusted to single cycle operation. Quickly converted to use automatic air operated magazine-feed and dial-feed fixtures.

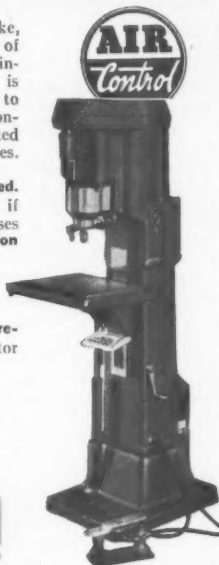
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Free Booklet gives complete details and shows this new Tapper at work. Available in three capacities. Write today.



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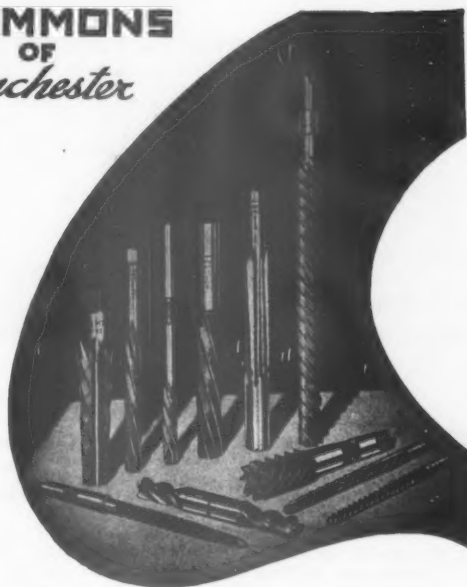
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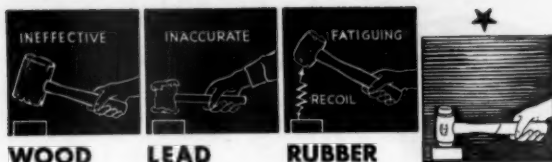
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makes a clumsy tool that will split and crack.

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metal heads have edges that turn, break and fly off.

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heads and faces stay accurate, absorb shock and wear longest.

★ **Chicago Rawhide Hammers and Mallets** are the tools for striking hard accurate blows safely on any surface that must not be cracked, battered or marred. The tough Java Water Buffalo hide, coiled, compressed and treated for long life will not split, break or even dent, and has resilience to absorb rebound for easier, accurate blows.

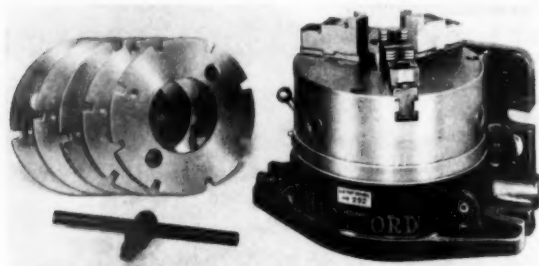


These hammers and mallets with genuine rawhide heads are quality tools for thrifty mechanics. Sold by industrial supply houses everywhere.

These replaceable faces of genuine rawhide "stay put" in the indestructible malleable iron heads of Chicago Rawhide hammers for thousands of accurate blows. No shifting—no separating—always true.

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New but tried, the Hartford SUPER-SPACER is widely adaptable for index milling, slotting, grinding and jig boring and drilling. Rigid enough for exacting tool room work, it is a definite cost-saver on short or long run production jobs. It can be set up in "jig time"—is ready to go on any job within its range. Standard equipment (shown above) includes six mask plates, self centering chuck and sliding handle wrench.

Get further details on this essential tool by writing

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March Chapter Meetings

BALTIMORE

March 11, 1940—Dinner 7:00 P.M., Technical session 8:00 P.M. Sears Auditorium, North Avenue and Harford. Speaker: P. H. Merriman, Plant Electrical Engineer of the Glenn L. Martin Company.

Subject: Resistance Welding in Aircraft, illustrated with slides and movies.

For Dinner Reservations: Nils H. Lou, 3515 Glenmore Ave., Baltimore, Md. Phone, Hamilton 0851.

BUFFALO

March 14th, 1940—Dinner 6:30 P.M. University Club—546 Delaware Ave., Buffalo, N.Y. Technical Session 8 P.M. Speaker: From one of the local plants. Name will be given in regular announcement.

MILWAUKEE

March 13 and 14, 1940—Meeting will be held in conjunction with the Wisconsin Engineering Conference at Pfister Hotel. Don't forget, fellows—a dance will top the evening of the 14th.

ONTARIO

March 8, 1940—6:30 P.M., Roberts Restaurant, Hamilton. Speaker: W. K. Bailey, Warner & Swasey Co. Subject: "Turret Lathes and Telescopes"

PEORIA

March 5, 1940—Dinner 6:15 P.M., Glen Oak Park Pavilion. Speaker: William H. Oldacre, D. A. Stuart Oil Co. Subject: "Cutting Fluids as a Part of Tool Design." Reservations: Everett Bowton, 412 Thrush Ave., Peoria, Ill.

ROCKFORD

March 14, 1940—Dinner Meeting, Entertainment, Educational Exhibits, Movies and Good fellowship.

Speaker: G. H. Sandborn, Fellows Gear Shaper Co.

Subject: "New Developments in Involute Gearing"

Speaker: Stuart C. Lawson, Ampco Metals, Inc.

Subject: "Modern Bronzes"

March 16, 1940—Third Annual All-Engineers' Ladies Nite. Dancing from 9:30 to 1.

ST. LOUIS

March 14, 1940—Melbourne Hotel.

Speaker: Malcolm F. Judkins, Chief Engineer, Firthite Division of the Firth Sterling Steel Co.

Subject: "The Manufacture and Use of Sintered Carbide and Tipped Tools"

SOUTH BEND

March 14, 1940—Rotary Room of Oliver Hotel.

Speaker: Francis Trecker, Kearney and Trecker Corp., Milwaukee. Subject: "A New Technique in the Art of Tool and Die Milling."

TOLEDO

March 12, 1940—6:45 P.M., Dinner Meeting. Yacht Club.

Speaker: Robert Harrison, The Chambersburg Engineering Co.

Subject: "Drop Forging Practice in Hammers"

TRI-CITY

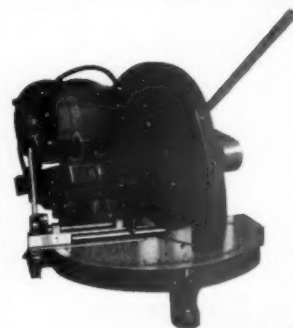
March 6, 1940—Dinner 6:30 P.M. at the LeClaire Hotel.

Speaker: William H. Oldacre, Vice President in charge of Research and Engineering, D. A. Stuart Oil Co., Chicago.

Subject: "Cutting Fluids as a Part of Tool Design."

TWIN CITY

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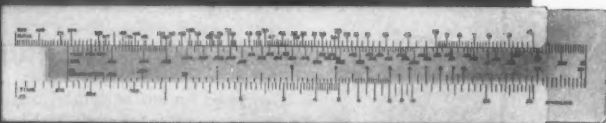
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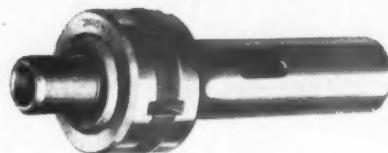
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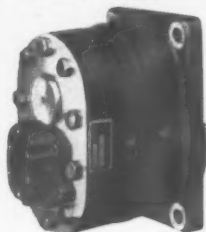
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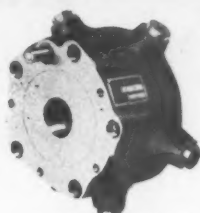
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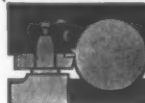
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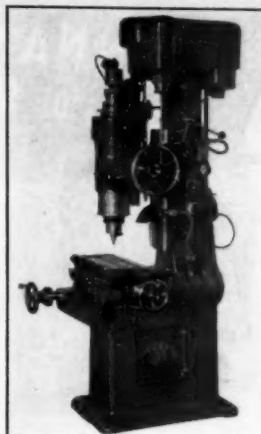
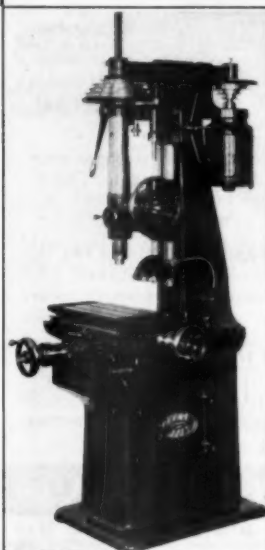
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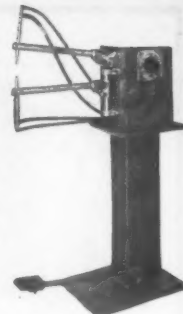
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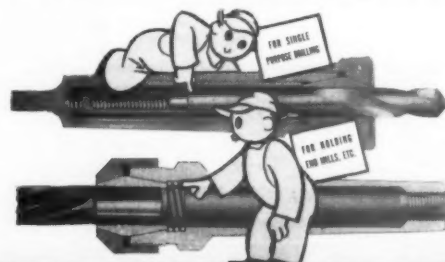
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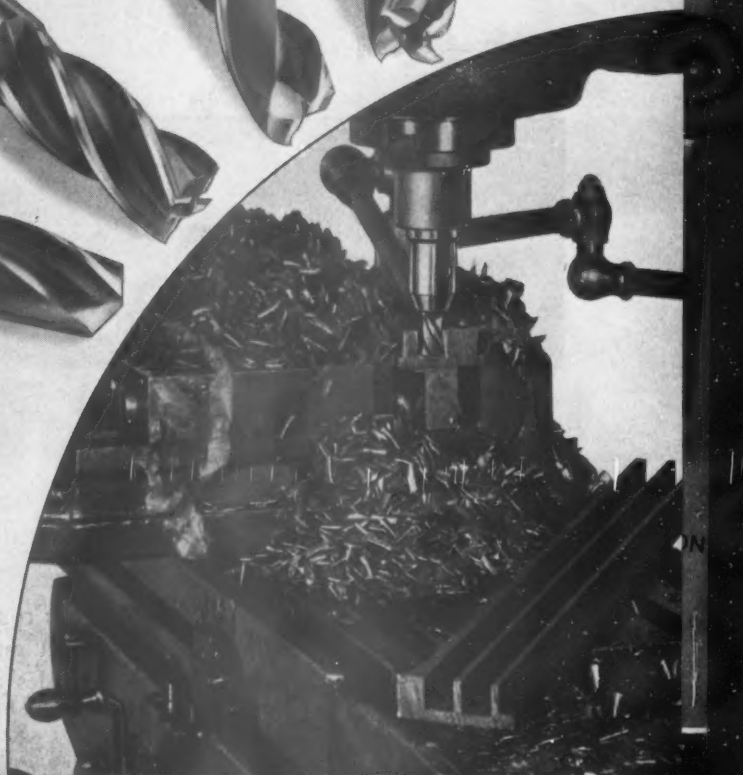
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